

2006 Buick Lucerne CXS

2006 HVAC Heating, Ventilation and Air Conditioning - Lucerne

2006 HVAC

Heating, Ventilation and Air Conditioning - Lucerne

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
A/C Compressor and Condenser Hose Retaining Nut	16 N.m	12 lb ft
A/C Compressor Discharge Hose Retaining Nut	16 N.m	12 lb ft
A/C Compressor Front Retaining Nut (LD8)	25 N.m	18 lb ft
A/C Compressor Hose Retaining Nut	16 N.m	12 lb ft
A/C Compressor Rear Retaining Bolt (LD8)	25 N.m	18 lb ft
A/C Compressor Suction Hose Retaining Nut	16 N.m	12 lb ft
A/C Compressor Retaining Bolt (L26)	25 N.m	18 lb ft
A/C Compressor Retaining Nut (LD8)	25 N.m	18 lb ft
A/C Compressor Retaining Nut (L26)	25 N.m	18 lb ft
A/C Compressor Retaining Stud (LD8)	25 N.m	18 lb ft
A/C Evaporator Case Screw	1.0 N.m	9 lb in
A/C Evaporator Hose Retaining Bolt	6 N.m	53 lb in
A/C Evaporator Hose Retaining Nut	16 N.m	12 lb ft
A/C Evaporator Tube Bolt	16 N.m	12 lb ft
A/C Refrigerant Pressure Sensor	5 N.m	44 lb in
Air Distribution Case Assembly Screw	1.0 N.m	9 lb in
Air Distribution Case Screw	1.0 N.m	9 lb in
Air Distribution Outer Duct Screw	1.0 N.m	9 lb in
Air Inlet Housing Screw	1.0 N.m	9 lb in
Blower Motor Resistor Screw	1.0 N.m	9 lb in
Blower Motor Screw	1.0 N.m	9 lb in
Condenser Line to Radiator Mounting Bolt	6 N.m	53 lb in
Condenser Mounting Bolt	9 N.m	80 lb in
Discharge Hose Nut to Condenser	16 N.m	12 lb ft
Floor Air Outlet Duct Screw	1.0 N.m	9 lb in
Grille Side Window Defogger Screw	1.0 N.m	9 lb in

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Heater and A/C Pipe Screw	1.0 N.m	9 lb in
Heater Core Tube Clamp Screw	1.0 N.m	9 lb in
Heater Inlet Pipe Adaptor Bolt	10 N.m	89 lb in
Heater Outlet Pipe Adaptor Bolt	10 N.m	89 lb in
HVAC Module Assembly Retaining Nut	9 N.m	80 lb in
Instrument Panel Center Air Outlet Duct Screw	1.0 N.m	9 lb in
Recirculation Actuator Screw	1.0 N.m	9 lb in
Side Window Defogger Duct Screw	1.0 N.m	9 lb in
Suction Hose Nut to Condenser	16 N.m	12 lb ft
Thermal Expansion Valve Bolt	16 N.m	12 lb ft
Windshield Defogger Nozzle Duct Screw	1.0 N.m	9 lb in

REFRIGERANT SYSTEM CAPACITIES

Refrigerant System Capacities

Application	Specification	
	Metric	English
PAG Oil GM P/N 12378526 for the United States. PAG Oil GM P/N 88900060		
• The Denso service compressor is precharged with 74 ml (2.5 oz.) of PAG oil.		
Condenser Replacement	40 ml	1.4 oz.
Evaporator Replacement	40 ml	1.4 oz.
Total System Oil Capacity	140 ml	4.7 oz.
Refrigerant Charge	0.65 kg	1.43 lb

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - HEATING, VENTILATION AND AIR CONDITIONING

Begin the system diagnosis with **Diagnostic System Check - Vehicle** . The Diagnostic System Check - Vehicle will provide the following information:

- The identification of the control modules which are not communicating
- The identification of any stored DTCs and their status

The use of the Diagnostic System Check - Vehicle will identify the correct procedures to begin vehicle diagnosis. These must be performed before system DTC or symptom diagnosis.

LEAK TESTING

Tools Required

- **J 39400-A** Halogen Leak Detector. See **Special Tools**.
- **J 41447** R-134A A/C Tracer Dye-Box of 24. See **Special Tools**.
- **J 42220** Universal 12V Leak Detection Lamp. See **Special Tools**.
- **J 43872** Fluorescent Dye Cleaner. See **Special Tools**.
- **J 46297** A/C Dye Injector Kit. See **Special Tools**.
- **J 46297-12** Replacement Dye Cartridges. See **Special Tools**.

Refrigerant Leak Testing

IMPORTANT: General Motors vehicles are now manufactured with fluorescent dye installed directly into the air conditioning (A/C) system.

The fluorescent dye mixes and flows with the polyalkylene glycol (PAG) oil throughout the refrigerant system.

Verifying some passive leaks may require using the **J 39400-A** , even though the A/C system contains fluorescent dye. See **Special Tools**.

The only time that adding additional fluorescent dye is required is after flushing the A/C system.

Fluorescent Leak Detector

Fluorescent dye will assist in locating any leaks in the A/C system.

IMPORTANT: PAG oil is water soluble.

- Condensation on the evaporator core or the refrigerant lines may wash the PAG oil and fluorescent dye away from the actual leak. Condensation may also carry dye through the HVAC module drain.
- Leaks in the A/C system will be indicated in a light green or yellow color when using the leak detection lamp.

Use the leak detection lamp in the following areas:

- All fittings or connections that use seal washers or O-rings
- All of the A/C components

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- The A/C compressor shaft seal
- The A/C hoses and pressure switches
- The HVAC module drain tube, if the evaporator core is suspected of leaking
- The service port sealing caps

The sealing cap is the primary seal for the service ports.

- Follow the instructions supplied with the **J 42220** . See **Special Tools**.
- To prevent false diagnosis in the future, thoroughly clean the residual dye from any area where leaks were found. Use a rag and the approved **J 43872** . See **Special Tools**.

Fluorescent Dye Injection

IMPORTANT: Use only fluorescent dye approved by General Motors.

- **J 41447** can be poured directly into a removed A/C component. See **Special Tools**.
- **J 46297-12** is injected into the low side port using **J 46297** . See **Special Tools**.
- Not all of the fluorescent dyes are compatible with PAG oil. Some types of dye decrease the oil viscosity or may chemically react with the oil.
- R-134A leak detection dye requires time to work. Depending upon the leak rate, a leak may not become visible for between 15 minutes and 7 days.

IMPORTANT: Do NOT overcharge the A/C system with dye. Use only one 7.39 ml (0.25 oz.) charge.

- To prevent false diagnosis, thoroughly clean any residual dye from the service port with a rag and the approved fluorescent dye cleaner **J 43872** . See **Special Tools**.

Halogen Leak Detector

CAUTION: Do not operate the detector in a combustible atmosphere since its sensor operates at high temperatures or personal injury and/or damage to the equipment may result.

Ensure that the vehicle has at least 0.45 kg (1 lb) of refrigerant in the A/C refrigeration system in order to perform a leak test. Refer to **Refrigerant Recovery and Recharging** for recharging the

A/C system.

IMPORTANT: Halogen leak detectors are sensitive to the following items:

- Windshield washing solutions
- Many solvents and cleaners
- Some adhesives used in the vehicle

Clean and dry all surfaces in order to prevent a false warning. Liquids will damage the detector.

IMPORTANT: Follow a continuous path in order to ensure that you will not miss any possible leaks. Test all areas of the system for leaks.

Follow the instructions supplied with the **J 39400-A** . See Special Tools.

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST (3.8L L26)

Test Description

This test measures the operating efficiency of the A/C system under the following conditions:

- The current ambient air temperature
- The current relative humidity
- The high side pressure of the A/C system
- The low side pressure of the A/C system
- The temperature of the air being discharged into the passenger compartment

The numbers below refer to the step numbers on the diagnostic table.

1: This step determines if the A/C system has at least the minimum refrigerant charge required to operate the system without damage.

2: This step measures the performance of the A/C system.

3: This step is to allow for vehicle variations as well as high ambient temperatures.

Air Conditioning (A/C) System Performance Test (3.8L L26)

Step	Action	Values	Yes	No
IMPORTANT: <ul style="list-style-type: none">• The ambient air temperature must be at least 16°C (60°F).				

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- Do not induce additional air flow across the front of the vehicle during the test.
- If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.
- Use a scan tool to command the cooling fans to high speed.

1	<ol style="list-style-type: none"> 1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. 4. Turn OFF the ignition. 5. Install the J 43600 ACR 2000 Air Conditioning Service Center. See Special Tools. 6. Record the ambient air temperature displayed on the J 43600 . See Special Tools. 7. Record the low and high side STATIC pressure readings. <p>Are both the low side and high side pressures within the specified value?</p>	<p>More than 16°C (60° F) - 345 kPa (50 psi)</p> <p>More than 24°C (75° F) - 483 kPa (70 psi)</p> <p>More than 33°C (90° F) - 690 kPa (100 psi)</p>	Go to Step 2	Go to <u>Leak Testing</u>
	<p>IMPORTANT: Record the relative humidity and the ambient air temperature at the time of the test.</p> <ol style="list-style-type: none"> 1. Close the vehicle doors and windows. 2. Open the drivers door window 12.7-15.2 cm (5-6 in). 3. Select the following HVAC control settings: 			

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- The Vent mode
 - The Recirculation mode
 - The A/C set to ON
 - The coldest temperature setting
 - The maximum blower speed
 - All A/C outlets set to OPEN
4. Install the temperature probes of the **J 43600** in the left and right center panel air outlets. See **Special Tools**.
 5. Apply the parking brake.
 6. Place the transaxle/transmission in one of the following positions:
 - PARK (Automatic)
 - NEUTRAL (Manual)
 7. Start the engine.
 8. Using a scan tool, command the engine cooling fans to high speed.
 9. Operate the A/C system for 5 minutes.
 10. Inspect the A/C components for the following conditions:
 - Abnormal frost areas
 - Unusual noises

IMPORTANT:

Press the RESET button before using the print function of the J 43600 . See Special Tools.

11. Print the following

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	<p>information:</p> <ul style="list-style-type: none"> • The panel outlet air temperatures • The low-side pressure • The high-side pressure <p>12. Compare the low and high side pressures and the panel output temperatures to the A/C performance table below.</p> <p>Does all the data recorded fall within the specified ranges of the A/C performance table?</p>		Go to Step 8	Go to Step 3
3	<p>If the pressures and temperatures recorded do not fall within the specified ranges:</p> <ol style="list-style-type: none"> 1. Continue to operate the A/C system for an additional 5 minutes. 2. Reset the J 43600 and record the pressures and temperatures again. See Special Tools. 3. Compare the low and high side pressures and the panel output temperature to the A/C performance table. <p>Does all the data recorded fall within the specified ranges of the A/C performance table?</p>	-	Go to Step 8	Go to Step 4
4	<p>Do the high and low side pressures fall within the specified ranges, but the panel outlet temperatures do not?</p>	-	Go to Air Conditioning (A/C) Diagnostics - Pressure Zone A	Go to Step 5

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5	Is the low side pressure greater than the specified range, but the high side pressure within or less than the specified range?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone B</u>	Go to Step 6
6	Are the low and high side pressures both greater than the specified ranges?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone C</u>	Go to Step 7
7	Is the high side pressure greater than the specified range, but the low side pressure is within or less than the specified range?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone D</u>	Go to Step 8
8	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to <u>Symptoms - HVAC Systems - Automatic</u>

Fig. 1: Identifying A/C System Pressure - Zone Classification
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Left Center Discharge Air Temperature
		Low Side	High Side	
13-18°C (55-65°F)	0-100%	130-227 kPa (19-33 psi)	482-799 kPa (70-116 psi)	9°C (48°F)
19-24°C (66-75°F)	Below 40%	130-234 kPa (19-34 psi)	613-950 kPa (89-138 psi)	10°C (50°F)
	Above 40%	130-254 kPa (19-37 psi)	661-999 kPa (96-145 psi)	13°C (54°F)
25-29°C (76-84°F)	Below 35%	179-254 kPa (26-37 psi)	840-1123 kPa (122-163 psi)	13°C (54°F)
	35-50%	192-261 kPa (28-38 psi)	861-1129 kPa (125-163 psi)	13°C (55°F)

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85°F)		psi)	164 psi)	
	Above 50%	199-268 kPa (29-39 psi)	881-1157 kPa (128-168 psi)	14°C (57°F)
30-35°C (86-95°F)	Below 30%	206-282 kPa (30-41 psi)	1019-1329 kPa (148-193 psi)	15°C (59°F)
	30-50%	213-289 kPa (31-42 psi)	1040-1336 kPa (151-194 psi)	15°C (59°F)
	Above 50%	220-289 kPa (32-42 psi)	1047-1357 kPa (152-197 psi)	18°C (63°F)
36-41°C (96-105°F)	Below 20%	234-310 kPa (34-45 psi)	1240-1550 kPa (180-225 psi)	18°C (63°F)
	20-40%	241-310 kPa (35-45 psi)	1247-1550 kPa (181-225 psi)	18°C (64°F)
	Above 40%	241-310 kPa (35-45 psi)	1260-1550 kPa (183-225 psi)	19°C (66°F)
42-46°C (106-115°F)	Below 20%	268-337 kPa (39-49 psi)	1460-1729 kPa (212-251 psi)	19°C (66°F)
	Above 20%	268-330 kPa (39-48 psi)	1467-1729 kPa (213-251 psi)	20°C (68°F)
47-49°C (116-120°F)	Below 30%	296-358 kPa (43-52 psi)	1646-1908 kPa (239-277 psi)	23°C (72°F)

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST (4.6L LD8)**Test Description**

This test measures the operating efficiency of the A/C system under the following conditions:

- The current ambient air temperature
- The current relative humidity
- The high side pressure of the A/C system
- The low side pressure of the A/C system
- The temperature of the air being discharged into the passenger compartment

The numbers below refer to the step numbers on the diagnostic table.

1: This step determines if the A/C system has at least the minimum refrigerant charge required to operate the system without damage.

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2: This step measures the performance of the A/C system.

3: This step is to allow for vehicle variations as well as high ambient temperatures.

Air Conditioning (A/C) System Performance Test (4.6L LD8)

Step	Action	Values	Yes	No
IMPORTANT: <ul style="list-style-type: none"> • The ambient air temperature must be at least 16°C (60°F). • Do not induce additional air flow across the front of the vehicle during the test. • If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test. • Use a scan tool to command the cooling fans to high speed. 				
1	<ol style="list-style-type: none"> 1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. 4. Turn OFF the ignition. 5. Install the J 43600 ACR 2000 Air Conditioning Service Center. See Special Tools. 6. Record the ambient air temperature displayed on the J 43600 . See Special Tools. 7. Record the low and high side STATIC pressure readings. <p>Are both the low side and high side pressures within the specified value?</p>	<p>More than 16°C (60° F) - 345 kPa (50 psi)</p> <p>More than 24°C (75° F) - 483 kPa (70 psi)</p> <p>More than 33°C (90° F) - 690 kPa (100 psi)</p>	Go to Step 2	Go to Leak Testing
	IMPORTANT: Record the relative humidity and the ambient air temperature at the time of the test. <ol style="list-style-type: none"> 1. Close the vehicle doors and 			

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- windows.
2. Open the drivers door window 12.7-15.2 cm (5-6 in).
 3. Select the following HVAC control settings:
 - The Vent mode
 - The Recirculation mode
 - The A/C set to ON
 - The coldest temperature setting
 - The maximum blower speed
 - All A/C outlets set to OPEN
 4. Install the temperature probes of the **J 43600** in the left and right center panel air outlets. See **Special Tools**.
 5. Apply the parking brake.
 6. Place the transaxle/transmission in one of the following positions:
 - PARK (Automatic)
 - NEUTRAL (Manual)
 7. Start the engine.
 8. Using a scan tool, command the engine cooling fans to high speed.
 9. Operate the A/C system for 5 minutes.
 10. Inspect the A/C components for the following conditions:
 - Abnormal frost areas
 - Unusual noises

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	<p>IMPORTANT: Press the RESET button before using the print function of the J 43600 . See <u>Special Tools</u>.</p> <p>11. Print the following information:</p> <ul style="list-style-type: none"> • The panel outlet air temperatures • The low-side pressure • The high-side pressure <p>12. Compare the low and high side pressures and the panel output temperatures to the A/C performance table below.</p> <p>Does all the data recorded fall within the specified ranges of the A/C performance table?</p>			
			Go to Step 8	Go to Step 3
3	<p>If the pressures and temperatures recorded do not fall within the specified ranges:</p> <ol style="list-style-type: none"> 1. Continue to operate the A/C system for an additional 5 minutes. 2. Reset the J 43600 and record the pressures and temperatures again. See <u>Special Tools</u>. 3. Compare the low and high side pressures and the panel output temperature to the A/C performance table. <p>Does all the data recorded fall within the specified ranges of the A/C performance table?</p>	-		
			Go to Step 8	Go to Step 4
	Do the high and low side pressures		Go to Air	

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4	fall within the specified ranges, but the panel outlet temperatures do not?	-	<u>Conditioning (A/C) Diagnostics - Pressure Zone A</u>	Go to Step 5
5	Is the low side pressure greater than the specified range, but the high side pressure within or less than the specified range?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone B</u>	Go to Step 6
6	Are the low and high side pressures both greater than the specified ranges?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone C</u>	Go to Step 7
7	Is the high side pressure greater than the specified range, but the low side pressure is within or less than the specified range?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone D</u>	Go to Step 8
8	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to <u>Symptoms - HVAC Systems - Automatic</u>

Fig. 2: Identifying A/C System Pressure - Zone Classification
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Left Center Discharge Air Temperature
		Low Side	High Side	
13-18°C (55-65°F)	0-100%	130-213 kPa (19-31 psi)	537-868 kPa (78-126 psi)	9°C (48°F)
19-24°C (66-75°F)	Below 40%	130-241 kPa (19-35 psi)	668-1026 kPa (97-149 psi)	10°C (50°F)
	Above 40%	130-261 kPa (19-38 psi)	730-1081 kPa (106-157 psi)	13°C (55°F)
25-29°C (76-85°F)	Below 35%	179-268 kPa (26-39 psi)	923-1212 kPa (134-176 psi)	13°C (54°F)
	35-50%	192-282 kPa (28-41 psi)	937-1219 kPa (136-177 psi)	13°C (55°F)

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	Above 50%	206-296 kPa (30-43 psi)	957-1240 kPa (139-180 psi)	15°C (59°F)
30-35°C (86-95°F)	Below 30%	220-310 kPa (32-45 psi)	1123-1440 kPa (163-209 psi)	15°C (59°F)
	30-50%	227-323 kPa (33-47 psi)	1129-1440 kPa (164-209 psi)	18°C (63°F)
	Above 50%	241-337 kPa (35-49 psi)	1136-1446 kPa (165-210 psi)	18°C (64°F)
36-41°C (96-105°F)	Below 20%	261-351 kPa (38-51 psi)	1350-1667 kPa (196-242 psi)	18°C (64°F)
	20-40%	268-358 kPa (39-52 psi)	1350-1660 kPa (196-241 psi)	19°C (66°F)
	Above 40%	275-372 kPa (40-54 psi)	1357-1660 kPa (197-241 psi)	20°C (68°F)
42-46°C (106-115°F)	Below 20%	303-385 kPa (44-56 psi)	1591-1860 kPa (231-270 psi)	22°C (70°F)
	Above 20%	310-392 kPa (45-57 psi)	1591-1853 kPa (231-269 psi)	23°C (72°F)
47-49°C (116-120°F)	Below 30%	344-427 kPa (50-62 psi)	1777-2039 kPa (258-296 psi)	25°C (77°F)

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE A

Air Conditioning (A/C) Diagnostics - Pressure Zone A

Step	Action	Values	Yes	No
<p>DEFINITION: The high and low side pressures may be normal or slightly less than normal.</p> <ul style="list-style-type: none"> • Air Delivery Concern • Slight Refrigerant Under Charge • Refrigerant Contamination 				
1	Were you sent here from the air conditioning (A/C) System Performance Test?	-		Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System</u>

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			Go to Step 2	Performance Test (4.6L LD8)
2	Refer to the instrument panel (I/P) outlet air temperatures recorded during the A/C system performance test. Does the discharge air temperature between the right and left center I/P outlets vary by more than 3°C (5°F)?	-	Go to Step 7	Go to Step 3
3	Did the customer mention that the A/C system output temperatures are good at first, but then turn warm during extended drives?	-	Go to Step 4	Go to Step 5
4	Increase engine speed to 2,000 RPM. During extended operation of the A/C system, does the low side pressure decrease, possibly accompanied by heavy frost on the liquid line between the expansion device and the evaporator?	-	Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone D</u>	Go to Step 5
5	<ol style="list-style-type: none"> 1. Refer to the pressures recorded during the A/C system performance test. CAUTION: <u>Refer to MOVING PARTS AND HOT SURFACES CAUTION .</u> 2. Inspect for the following conditions: <ul style="list-style-type: none"> • The high side pressure slightly greater than the specified pressure ranges but still within Zone A on the A/C Pressure-Zone 	-		

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	<p>Classification Chart in the A/C System Performance Test. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)Air Conditioning (A/C) System Performance Test (4.6L LD8)</u> .</p> <ul style="list-style-type: none">• The discharge line is hot.• The suction line is cool.			
	Do the listed conditions exist?		Go to Step 7	Go to Step 6
6	<p>1. Refer to the pressures recorded during the A/C system performance test.</p> <p>2. Inspect for the following conditions:</p> <ul style="list-style-type: none">• The low side pressure slightly lower than the specified pressure ranges but still within zone A on the A/C Pressure-Zone Classification Chart in the A/C System Performance Test. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)Air Conditioning (A/C) System Performance Test (4.6L LD8)</u> .• The discharge line is warm-to-hot.	-		

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	<ul style="list-style-type: none"> The suction line is cool-to-warm. 			
	Do the listed conditions exist?		Go to Step 8	Go to <u>Too Hot in Vehicle</u>
7	<p>The A/C system may be undercharged.</p> <ol style="list-style-type: none"> Leak test the A/C system. Refer to <u>Leak Testing</u>. Recharge the A/C system to specifications. Refer to <u>Refrigerant Recovery and Recharging</u>. 	-		
	Is the action complete?		Go to Step 14	-
8	<p>The A/C system may be contaminated.</p> <p>View the information screen on J 43600 ACR 2000 Air Conditioning Service Center for detection of foreign gases in the A/C system. See <u>Special Tools</u>.</p> <p>Do foreign gases exist?</p>	-		
			Go to Step 9	Go to Step 10
9	<ol style="list-style-type: none"> Evacuate the A/C system to a scavenging tank. Refer to <u>Refrigerant Recovery and Recharging</u>. Recharge the A/C system to specifications. 	-		
	Is the action complete?		Go to Step 14	-
	<p>The A/C system may contain too much moisture or air.</p> <ol style="list-style-type: none"> Evacuate and recharge the A/C system to specifications. Refer to <u>Refrigerant Recovery and Recharging</u>. 			

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10	<p>2. Operate the A/C system and check the I/P outlet air temperatures. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>.</p> <p>Are the I/P outlet air temperatures within the specified ranges of the A/C Performance Test Table?</p>	-	Go to Step 15	Go to Step 11
11	<p>The A/C system may contain too much refrigerant oil.</p> <p>1. Recover the refrigerant from the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>2. Remove the condenser. Refer to <u>Condenser Replacement</u>.</p> <p>3. Drain and measure the refrigerant oil from the condenser.</p> <p>Was more than the specified amount of refrigerant oil drained from the condenser?</p>	148 ml (5 oz.)	Go to Step 12	Go to Step 13
12	<p>1. Install the condenser. Refer to <u>Condenser Replacement</u>.</p> <p>2. Flush the A/C system. Refer to <u>Flushing</u>.</p> <p>3. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p>	-		

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	Are the actions complete?		Go to Step 14	-
13	<ol style="list-style-type: none"> 1. Add the specified amount of refrigerant oil to the condenser. Refer to <u>Refrigerant System Capacities.</u> 2. Install the condenser. Refer to <u>Condenser Replacement.</u> 3. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging.</u> 	-		
	Are the actions complete?		Go to Step 14	-
14	<ol style="list-style-type: none"> 1. Record the low and high side pressures and the I/P outlet air temperature. 2. Compare the I/P outlet air temperatures to those listed in the A/C System Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8).</u> <p>Are the high and low side pressures and I/P outlet air temperatures within specifications?</p>	-		Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>
15	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>	-		Go to <u>Symptoms - HVAC Systems - Automatic</u> or <u>Symptoms - HVAC Systems - Manual</u>
			System OK	

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AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE B**Air Conditioning (A/C) Diagnostics - Pressure Zone B**

Step	Action	Yes	No
DEFINITION: The low side pressure is higher than normal and the high side pressure is lower than normal.			
<ul style="list-style-type: none">• Malfunctioning A/C Compressor• Refrigerant Under Charge			
1	Were you sent here from the A/C System Performance Test?	Go to Step 2	Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>
2	After continued operation of the A/C system, do the low and high side pressures equalize or become static?	Go to Step 5	Go to Step 3
	<ol style="list-style-type: none">1. Refer to the pressures recorded during the A/C System Performance Test.2. Inspect for the following conditions: CAUTION: Refer to <u>MOVING PARTS AND HOT SURFACES CAUTION</u> . <ul style="list-style-type: none">• The low side pressure is equal to or greater than the specified pressure range of the A/C Performance Table. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u><u>Air Conditioning (A/C) System Performance</u>		

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3	<p><u>Test (4.6L LD8) .</u></p> <ul style="list-style-type: none">• The high side pressure is below the specified pressure range of the A/C Performance Table. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u><u>Air Conditioning (A/C) System Performance Test (4.6L LD8) .</u>• The low side refrigerant line at the compressor feels cool-to-warm.• The high side refrigerant line at the compressor feels warm-to-hot. <p>Do the listed conditions exist?</p>	Go to Step 5	Go to Step 4
4	<ol style="list-style-type: none">1. Refer to the pressures recorded during the A/C System Performance Test.2. Inspect for the following conditions:<ul style="list-style-type: none">• The low side pressure is greater than the specified pressure range of the A/C Performance Table. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u><u>Air Conditioning (A/C) System Performance Test (4.6L LD8) .</u>• The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u><u>Air Conditioning (A/C)</u>		Go to Air

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	<p><u>System Performance Test (4.6L LD8)</u> .</p> <ul style="list-style-type: none"> • The low side refrigerant line at the compressor feels warm. • The high side refrigerant line at the compressor feels warm-to-hot. 		<p><u>Conditioning (A/C) System Performance Test (3.8L L26) or Air Conditioning (A/C) System Performance Test (4.6L LD8)</u></p>
	Do the listed conditions exist ?	Go to Step 5	
5	<p>The A/C system has a low refrigerant charge.</p> <p>Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the action complete?</p>	Go to Step 6	-
6	<ol style="list-style-type: none"> 1. After you perform the repairs, record the following information: <ul style="list-style-type: none"> • The low and the high side pressures • The instrument panel outlet air temperature 2. Compare the pressures and the temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>. <p>Are the readings within the specified ranges found on the A/C Performance Chart?</p>	Go to Step 13	Go to Step 7
7	<ol style="list-style-type: none"> 1. The A/C compressor is malfunctioning. 2. Remove the expansion device and inspect for contamination. Refer to <u>Thermal Expansion Valve</u> 		

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	<u>Replacement.</u>		
	Did you find metal flakes on the expansion device?	Go to Step 9	Go to Step 8
8	Inspect the expansion device for a brown, powdery residue indicating desiccant in the A/C system. Is a brown, powdery residue present?	Go to Step 11	Go to Step 12
9	<ol style="list-style-type: none"> 1. Remove the discharge hose from the compressor. Refer to <u>Discharge Hose Replacement (L26)</u> or <u>Discharge Hose Replacement (LD8)</u>. 2. Remove the suction hose from the compressor. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8)</u>. 3. Inspect for metal flake contamination at the line connections and the compressor ports. <p>Is metal flake contamination present?</p>	Go to Step 10	Go to Step 12
10	<ol style="list-style-type: none"> 1. Replace the A/C compressor. Refer to <u>Compressor Replacement (LD8)</u> or <u>Compressor Replacement (L26)</u>. 2. Replace the thermal expansion valve (TXV). Refer to <u>Thermal Expansion Valve Replacement.</u> 3. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging.</u> <p>Is the action complete?</p>	Go to Step 13	-
	<ol style="list-style-type: none"> 1. Flush the A/C system. Refer to <u>Flushing.</u> 		

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11	<ol style="list-style-type: none">2. Replace the TXV. Refer to <u>Thermal Expansion Valve Replacement</u>.3. Replace the A/C compressor. Refer to <u>Compressor Replacement (LD8)</u> or <u>Compressor Replacement (L26)</u>.4. Replace the condenser. Refer to <u>Condenser Replacement</u>.5. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Is the action complete?</p>	Go to Step 13	-
12	<ol style="list-style-type: none">1. Replace the A/C compressor. Refer to <u>Compressor Replacement (LD8)</u> or <u>Compressor Replacement (L26)</u>.2. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Is the action complete?</p>	Go to Step 13	-
13	<p>Operate the system in order to verify the repair</p> <p>Did you find and correct the condition?</p>	System OK	Go to <u>Symptoms - HVAC Systems - Automatic or Symptoms - HVAC Systems - Manual</u>

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE C**Air Conditioning (A/C) Diagnostics - Pressure Zone C**

Step	Action	Yes	No
DEFINITION: The low and the high side pressures are both higher than normal.			
<ul style="list-style-type: none">• Restricted Condenser Air Flow			

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- Cooling Fan Malfunction
- Expansion Devise Malfunction

1	<p>Were you sent here from the A/C System Performance Test?</p>	Go to Step 2	<p>Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u></p>
2	<p>1. Start the engine. 2. Turn ON the A/C. 3. Inspect for proper cooling fan operation. Refer to <u>Cooling System Description and Operation</u> .</p> <p>Are the cooling fans ON and operating properly?</p>	Go to Step 3	Go to Step 5
3	<p>Visually inspect for the following conditions:</p> <ul style="list-style-type: none"> • Damaged condenser cooling fins • Missing or misaligned air baffles • Restricted air flow <p>Do any of these conditions exist?</p>	Go to Step 4	Go to Step 6
4	<p>Repair the air flow restriction. Is the action complete?</p>	Go to Step 9	-
5	<p>Repair the fault to the cooling fan operation fault. Refer to <u>Cooling Fan Inoperative</u> . Is the action complete?</p>	Go to Step 9	-
	<p>CAUTION:</p>		

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6	<p>Refer to <u>MOVING PARTS AND HOT SURFACES CAUTION</u> .</p> <p>Feel the liquid line on both sides of the expansion device.Are the temperatures on both side of the expansion device similar?</p>	Go to Step 7	Go to Step 8
7	<p>Replace the damaged or faulty expansion devise. Refer to <u>Thermal Expansion Valve Replacement</u>.</p> <p>Is the action complete?</p>	Go to Step 9	-
8	<ol style="list-style-type: none"> 1. Air is in the refrigerant system, or the system is overcharged. Refer to the view screen on the J 43600 ACR 2000 Air Conditioning Service Center for foreign gas content in the refrigerant. See <u>Special Tools</u>. 2. Recover and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Is the action complete?</p>	Go to Step 9	-
9	<ol style="list-style-type: none"> 1. Record the low and high side pressures and the instrument panel outlet air temperature after you have performed the repairs. 2. Compare the pressures and instrument panel outlet air temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>. <p>Are the readings within the specified ranges listed in the A/C Performance Chart?</p>	Go to Step 10	Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>

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10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to <u>Symptoms - HVAC Systems - Automatic</u> in HVAC Systems - Automatic or <u>Symptoms - HVAC Systems - Manual</u> in HVAC Systems - Manual
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AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE D**Air Conditioning (A/C) Diagnostics - Pressure Zone D**

Step	Action	Yes	No
DEFINITION: The low side pressure is lower than normal and the high side pressure is higher than normal. <ul style="list-style-type: none">• A restriction in the A/C system• Debris in the system			
1	Were you sent here from the A/C System Performance Test?	Go to Step 2	Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>
2	CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> . Feel the liquid line before the expansion device. Is the liquid line cold before the expansion device?	Go to Step 3	Go to Step 8
	Feel along the surfaces of the following		

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3	<p>high side components for a sudden drop in temperature. The high side components should feel warm/hot from the compressor all the way to the expansion device.</p> <ul style="list-style-type: none">• The compressor discharge hose• The condenser• The liquid line between the condenser and the expansion device <p>Did you detect an abrupt drop in temperature along the surfaces of any of the listed components?</p>	Go to Step 7	Go to Step 4
4	<ol style="list-style-type: none">1. Feel the liquid line at the expansion device location for extreme cold, possibly accompanied by heavy frost.2. Feel along the liquid line after the expansion device location for warm temperature. <p>Is the liquid line extremely cold at the expansion device location and warm after the expansion device location?</p>	Go to Step 11	Go to Step 5
5	<p>Feel along the surfaces of the following low side components for a sudden change in temperature:</p> <ul style="list-style-type: none">• The evaporator inlet tube between the expansion device and the evaporator core• The evaporator outlet tube between the evaporator core and the compressor• The condenser• The compressor suction hose		

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	Did you detect an abrupt temperature change felt along the surfaces of any of the listed components?	Go to Step 7	Go to Step 6
6	<p>Feel along the surfaces of low and high side components to compare the overall temperatures:</p> <ul style="list-style-type: none"> • The evaporator inlet tube between the expansion device and the evaporator core • The evaporator outlet tube between the evaporator core and the accumulator • The compressor suction hose • The compressor discharge hose • The condenser • The evaporator inlet tube between the condenser and the expansion device <p>Are the temperatures of these components only mildly warm?</p>		
7	<ol style="list-style-type: none"> 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove the restriction from the component, or replace the component which produced an abrupt temperature drop. <p>Is the repair complete?</p>	Go to Step 14	Go to Step 8
	<ol style="list-style-type: none"> 1. Recover the refrigerant and evacuate the system. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Record the weight of the recovered refrigerant. 	Go to Step 9	-

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8	<p>3. Compare the weight of the recovered refrigerant with the system capacity. Refer to <u>Refrigerant System Capacities</u>.</p> <p>Is the weight of the recovered refrigerant charge greater than 75% of the total system capacity?</p>	Go to Step 9	Go to Step 10
9	<p>Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the cooling performance improved?</p>	Go to Step 21	Go to Step 10
10	<p>1. Leak test the system. Refer to <u>Leak Testing</u>.</p> <p>2. Repair any leaks.</p> <p>Is the action complete?</p>	Go to Step 21	-
11	<p>1. The expansion device is restricted.</p> <p>2. Replace the expansion device. Refer to <u>Thermal Expansion Valve Replacement</u>.</p> <p>3. If the expansion device was restricted, note the type of debris present.</p> <p>Are metal flakes present?</p>	Go to Step 12	Go to Step 13
12	<p>1. Remove the suction hose from the vehicle. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8)</u>.</p> <p>2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel.</p> <p>3. Observe the amount of debris collected in the shop towel.</p> <p>Did a large amount of debris collect in the</p>		

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	shop towel?	Go to Step 18	Go to Step 20
13	<p>If the expansion device was restricted with a brown or black residue, perform the following procedure:</p> <ol style="list-style-type: none"> 1. Flush the A/C system. Refer to <u>Flushing</u>. 2. Replace the condenser. Refer to <u>Condenser Replacement</u>. 		
	Are the repairs complete?	Go to Step 21	-
14	<ol style="list-style-type: none"> 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Disconnect the discharge hose from the compressor. Refer to <u>Discharge Hose Replacement (L26)</u> or <u>Discharge Hose Replacement (LD8)</u>. 3. Disconnect the suction hose from the compressor. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8)</u>. 4. Inspect for the presence of debris in the compressor suction port. 		
	Is there debris present in the compressor suction port?	Go to Step 15	Go to Step 19
15	<ol style="list-style-type: none"> 1. Remove the debris from the suction port. 2. Inspect the expansion device for damage or debris. Refer to <u>Thermal Expansion Valve Replacement</u>. 		
	Did you find evidence of damage or debris?	Go to Step 17	Go to Step 16
	If the expansion device does not show any		

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16	<p>signs of damage or debris, perform the following procedure:</p> <ol style="list-style-type: none"> 1. Remove the discharge hose from the vehicle. Refer to <u>Discharge Hose Replacement (L26)</u> or <u>Discharge Hose Replacement (LD8)</u>. 2. Remove the suction hose from the vehicle. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8)</u>. 3. Inspect the hoses for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 4. Observe the amount of debris collected in the shop towel. <p>Did a large amount of debris collected in the shop towel?</p>	Go to Step 18	Go to Step 19
17	<ol style="list-style-type: none"> 1. Replace the expansion device. Refer to <u>Thermal Expansion Valve Replacement</u>. 2. If the expansion device was restricted, note the type of debris present. <p>Are metal flakes present?</p>	Go to Step 12	Go to Step 13
18	<p>If a large amount of debris collected in the shop towel from the discharge hose or the suction hose, perform the following procedure: Replace the condenser. Refer to <u>Condenser Replacement</u>. Is the action complete?</p>	Go to Step 19	-
	<ul style="list-style-type: none"> • Install the discharge hose. Refer to <u>Discharge Hose Replacement</u> 		

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19	<p><u>(L26) or Discharge Hose Replacement (LD8).</u></p> <ul style="list-style-type: none"> • Install the suction hose. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8).</u> <p>Are the actions complete?</p>	Go to Step 21	-
20	<ol style="list-style-type: none"> 1. Install the discharge hose. Refer to <u>Discharge Hose Replacement (L26) or Discharge Hose Replacement (LD8).</u> 2. Install the suction hose. Refer to <u>Suction Hose Replacement (L26)</u> or <u>Suction Hose Replacement (LD8).</u> 3. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging.</u> <p>Are the actions complete?</p>	Go to Step 21	-
21	<ol style="list-style-type: none"> 1. Record the low and high side pressures and the instrument panel outlet air temperature after you perform the repairs. 2. Compare the pressures and instrument panel outlet air temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8).</u> <p>Are the readings within the specified ranges as shown on the A/C Performance Chart?</p>	Go to Step 22	Go to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u>
	Operate the system in order to verify the		Go to Symptoms

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22	repair. Did you find and correct the condition?	System OK	- <u>HVAC Systems - Automatic</u> or <u>Symptoms - HVAC Systems - Manual</u>
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HEATING PERFORMANCE DIAGNOSTIC

Heating Performance Diagnostic

Step	Action	Yes	No
DEFINITION: Heating system performance.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to Too Cold in Vehicle for the automatic system or Too Cold in Vehicle for the manual system
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to Step 3	Go to Step 9
3	CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> . 1. Allow the engine to idle. 2. Select the FLOOR mode. 3. Select the minimum blower speed. 4. Select the warmest temperature setting. 5. Feel the temperature of the inlet and outlet heater hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to Step 7	Go to Step 4

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4	<ol style="list-style-type: none"> 1. Install a thermometer into the center I/P PANEL air outlet. 2. Secure a thermometer to the heater core outlet hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: <ul style="list-style-type: none"> • The center IP PANEL air outlet • The heater core outlet hose 7. Compare the recorded temperatures. <p>Are the 2 temperature readings about equal?</p>	Go to Step 5	Go to Step 6
5	<ol style="list-style-type: none"> 1. Inspect and repair the following areas of the vehicle for cold air leaks: <ul style="list-style-type: none"> • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs. <p>Are the repairs complete?</p>	Go to Step 10	-
6	<ol style="list-style-type: none"> 1. Inspect the temperature door operation. Refer to <u>Diagnostic System Check - Vehicle</u> . 2. Perform any necessary repairs. <p>Are the repairs complete?</p>	Go to Step 10	-
	<ol style="list-style-type: none"> 1. Turn OFF the engine. 2. Backflush the heater core. Refer to <u>Flushing</u> . 		

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7	<p>3. Start the engine.</p> <p>4. Select the FLOOR mode.</p> <p>5. Select the minimum blower speed.</p> <p>6. Select the warmest temperature setting.</p> <p>7. Feel the temperature of the inlet and outlet heater hoses at the heater core.</p> <p>Does the inlet heater hose feel warmer than the outlet heater hose?</p>	Go to Step 8	Go to Step 10
8	<p>Replace the heater core. Refer to <u>Heater Core Replacement</u>.</p> <p>Is the repair complete?</p>	Go to Step 10	-
9	<p>Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> .</p> <p>Is the repair complete?</p>	Go to Step 10	-
10	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>	System OK	Go to Step 2

DEFROSTING INSUFFICIENT

Defrosting Insufficient

Step	Action	Yes	No
DEFINITION: Time required to defrost the windshield is longer than usual.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual or Symptoms - HVAC Systems - Automatic</u>
2	<p>1. Start the engine.</p> <p>2. Select the DEFROST mode.</p> <p>3. Select the maximum blower speed.</p>		

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	Does sufficient air flow from the defroster outlets?	Go to Step 3	Go to Step 10
3	Measure the engine operating temperature. Does the engine reach normal operating temperature?	Go to Step 4	Go to Step 8
4	<ol style="list-style-type: none"> 1. Select the minimum blower speed. 2. Select the warmest temperature setting. <p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <ol style="list-style-type: none"> 3. Feel the temperature of the inlet and outlet hoses at the heater core. <p>Does the inlet heater hose feel warmer than the outlet heater hose?</p>	Go to Step 11	Go to Step 5
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to Step 7	Go to Step 6
6	Repair the A/C compressor clutch. Refer to <u>HVAC Compressor Clutch Does Not Engage</u> for the automatic system or to <u>HVAC Compressor Clutch Does Not Engage</u> for the manual system. Is the repair complete?	Go to Step 14	-
7	Perform the A/C system performance test. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u> . Is the A/C system operating within the specifications?	Go to Step 9	Go to Step 12
8	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 14	-

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9	Inspect for correct operation of the recirculation door. Is the recirculation door operating correctly?	Go to Step 14	Go to Step 13
10	Repair the air delivery concern. Refer to <u>Air Delivery Improper</u> for the automatic system or to <u>Air Delivery Improper</u> for the manual system. Is the repair complete?	Go to Step 14	-
11	Repair the heating concern. Refer to <u>Heating Performance Diagnostic</u> . Is the repair complete?	Go to Step 14	-
12	Repair the A/C performance concern. Refer to <u>Air Conditioning (A/C) System Performance Test (3.8L L26)</u> or <u>Air Conditioning (A/C) System Performance Test (4.6L LD8)</u> . Is the repair complete?	Go to Step 14	-
13	Repair the recirculation door concern. Refer to <u>Air Recirculation Malfunction</u> for the automatic system or to <u>Air Recirculation Malfunction</u> for the manual system. Is the repair complete?	Go to Step 14	-
14	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - BLOWER MOTOR

Noise Diagnosis - Blower Motor

Step	Action	Yes	No
DEFINITION: Noise originating in the blower motor			
1	Were you sent here from Symptoms or another diagnostic table?		Go to <u>Symptoms - HVAC Systems - Automatic</u> or <u>Symptoms -</u>

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		Go to Step 2	<u>HVAC Systems</u> <u>- Manual</u>
2	Inspect the air inlet grille for debris. Is debris present?	Go to Step 8	Go to Step 3
3	<ol style="list-style-type: none"> 1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn ON the ignition, with the engine OFF. 4. Cycle the blower motor through all of the speeds and modes in order to determine where and when the noise occurs. <p>Is a noise evident during the blower operation?</p>	Go to Step 4	Go to Step 11
4	<p>Inspect for excessive vibration at each blower motor speed by feeling the blower case.</p> <p>Is excess vibration present?</p>	Go to Step 6	Go to Step 5
5	<p>Listen to the blower motor at each speed.</p> <p>Is the blower motor making a squeaking or chirping noise?</p>	Go to Step 9	Go to Step 11
6	<ol style="list-style-type: none"> 1. Remove the blower motor. Refer to <u>Blower Motor Replacement</u>. 2. Inspect the blower motor impeller for deposits of foreign material. 3. Inspect the blower motor for deposits of foreign material. <p>Did you find any foreign material on the blower motor or blower motor impeller?</p>	Go to Step 8	Go to Step 7
7	<p>Inspect the blower motor for the following conditions:</p> <ul style="list-style-type: none"> • Cracked blades • A loose impeller retainer • Improper impeller alignment 		

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	Did you find any of these conditions?	Go to Step 9	Go to Step 10
8	Remove the foreign material. Is the action complete?	Go to Step 10	-
9	Replace the blower motor. Refer to <u>Blower Motor Replacement</u> . Is the repair complete?	Go to Step 11	-
10	Install the blower motor. Refer to <u>Blower Motor Replacement</u> . Is the action complete?	Go to Step 11	-
11	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - AIR CONDITIONING (A/C) SYSTEM

Noise Diagnosis - Air Conditioning (A/C) System

Step	Action	Yes	No
DEFINITION: Noise originating from the A/C compressor, drive belt or the A/C lines.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Automatic</u> or <u>Symptoms - HVAC Systems - Manual</u>
2	<ol style="list-style-type: none"> A/C system noises can be generally categorized into three areas: <ul style="list-style-type: none"> • Screeching, Squealing, Chirping noises • Moaning noises • Vibration/Rattle noises Start the engine. Ensure that the A/C is ON. <p>Is a screeching, squealing noise heard when the A/C is engaged?</p>	Go to Step 3	Go to Step 9

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3	With the engine OFF, inspect the drive belt for excessive wear. Refer to <u>Drive Belt Excessive Wear Diagnosis</u> for the 4.6L engine or <u>Drive Belt Excessive Wear Diagnosis</u> for the 3.8L engine. Is the drive belt excessively worn?	Go to Step 18	Go to Step 4
4	Inspect the drive belt tension. Refer to <u>Drive Belt Tensioner Diagnosis</u> for the 4.6L engine or <u>Drive Belt Tensioner Diagnosis</u> for the 3.8L engine. Is the drive belt tension correct?	Go to Step 5	Go to Step 19
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to Step 17	Go to Step 6
6	<ol style="list-style-type: none"> 1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor and the clutch. Is the A/C compressor locked up?	Go to Step 23	Go to Step 7
7	Is the A/C compressor clutch slipping?	Go to Step 23	Go to Step 8
8	CAUTION: Refer to <u>MOVING PARTS AND HOT SURFACES CAUTION</u> . Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to Step 15	Go to Step 10
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to Step 10	Go to Step 12
10	Listen to the A/C compressor components and mounting for noise concerns using a stethoscope. Are any of these components loose, damaged or excessively worn?	Go to Step 20	Go to Step 11
	<ol style="list-style-type: none"> 1. Idle the engine. 2. Engage the A/C compressor clutch. 		

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11	<p>3. Using a stethoscope, move around the entire refrigerant plumbing system. Listening for any abnormal noises caused by a component of the A/C system touching another component.</p> <p>Are any of the A/C components grounding out and causing a vibration noise?</p>	Go to Step 22	Go to Step 13
12	<p>Does a vibration or rattle noise exist when the A/C clutch is engaged?</p>	Go to Step 13	Go to Step 14
13	<p>Does the noise stop when the A/C clutch is disengaged?</p>	Go to Step 15	Go to Step 24
14	<p>1. Idle the engine in PARK with the A/C compressor clutch engaged.</p> <p>2. Using a stethoscope, move around the entire A/C system testing for any abnormal noises caused by a component.</p> <p>Do any of the A/C components cause an abnormal noise?</p>	Go to Step 21	Go to Step 24
15	<p>Verify that the A/C system is properly charged. Refer to <u>Refrigerant System Capacities</u>.</p> <p>Is the A/C system properly charged?</p>	Go to Step 24	Go to Step 16
16	<p>Recharge the A/C system to specification. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the abnormal compressor noise still present?</p>	Go to Step 23	Go to Step 25
17	<p>Repair the oil leak. Refer to the appropriate repair procedure for the 4.6L engine.</p> <p>Is the repair complete?</p>	Go to Step 25	-
18	<p>Replace the drive belt. Refer to <u>Drive Belt Replacement</u> for the 4.6L engine or <u>Drive Belt Replacement</u> for the 3.8L engine.</p>		

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	Is the repair complete?	Go to Step 25	-
19	Replace the drive belt tensioner. Refer to <u>Drive Belt Tensioner Replacement</u> for the 4.6L engine <u>Drive Belt Tensioner Replacement</u> for the 3.8L engine. Is the repair complete?	Go to Step 25	-
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to Step 25	-
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to Step 25	-
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to Step 25	-
23	Replace the A/C compressor. Refer to <u>Compressor Replacement (LD8)</u> or <u>Compressor Replacement (L26)</u> . Is the repair complete?	Go to Step 25	-
24	The concern may be caused by an engine related component. Refer to <u>Vibration Analysis - Engine</u> . Did you find and correct the condition?	Go to Step 25	-
25	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - HVAC MODULE

Noise Diagnosis - HVAC Module

Step	Action	Yes	No
DEFINITION: Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?		Go to <u>Symptoms - HVAC Systems - Automatic</u> or <u>Symptoms - HVAC Systems</u>

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		Go to Step 2	- Manual
2	<ol style="list-style-type: none"> 1. Start the engine. 2. Cycle through all of the following: <ul style="list-style-type: none"> • Blower motor speeds • HVAC modes • Temperature control settings 3. Determine the type of noise: <ul style="list-style-type: none"> • Scrape, pop • Tick/click, chirp or groaning • Air rush/whistle <p>Is a scrape or pop noise evident when selecting modes or temperature settings?</p>	Go to Step 6	Go to Step 3
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to Step 6	Go to Step 4
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to Step 6	Go to Step 5
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to Step 6	Go to Step 6
6	<p>Remove the HVAC module. Refer to <u>HVAC Module Assembly Replacement.</u></p> <p>Is the action complete?</p>	Go to Step 7	-
7	<ol style="list-style-type: none"> 1. Inspect the air flow doors for proper operation. 2. Inspect the ducts for obstructions or foreign materials. <p>Were any of these conditions found?</p>	Go to Step 10	Go to Step 8
8	<p>Inspect the mode and temperature doors and seals for warping or cracking.</p> <p>Are the doors in normal condition?</p>	Go to Step 11	Go to Step 9
9	<p>Replace the appropriate door and/or seals.</p> <p>Is the repair complete?</p>	Go to Step 11	-
10	Remove any obstructions or foreign material found.		

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	Is the action complete?	Go to Step 11	-
11	Install the HVAC Module. Refer to <u>HVAC Module Assembly Replacement.</u>		
	Is the action complete?	Go to Step 12	-
12	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

ODOR DIAGNOSIS**Odor Diagnosis**

Step	Action	Yes	No
DEFINITION: Odor originating or noticed through the HVAC system.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	<ol style="list-style-type: none">1. Sit inside the vehicle.2. Close all of the doors and windows.3. Start the engine.4. Allow the engine idle at normal operating temperature.5. Select the maximum blower speed.6. Select the PANEL air outlet mode.7. Select the coldest temperature setting.8. Cycle through all of the blower speeds, modes and temperatures to define what type of odor is present.<ul style="list-style-type: none">• Musty smell• Coolant smell• Oil smell <p>Does the odor have a musty smell?</p>	Go to Step 3	Go to Step 8

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3	Inspect the HVAC filter and the air inlet grille for debris. Is debris present?	Go to Step 4	Go to Step 5
4	Remove any debris. Is the action complete?	Go to Step 15	-
5	Inspect for wet carpeting. Is the carpet wet?	Go to Step 6	Go to Step 8
6	Inspect for the following conditions: 1. Water leaks around the windshield 2. Blockage of the HVAC module drain 3. Leaks around the door seals Is a leak present?	Go to Step 7	Go to Step 15
7	Repair the leak as necessary. Is the repair complete?	Go to Step 15	-
8	Does the odor have a coolant smell?	Go to Step 9	Go to Step 12
9	Inspect the cooling system for leaks. Refer to <u>Loss of Coolant</u> . Is a leak present?	Go to Step 10	Go to Step 12
10	Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield. Is the condition present?	Go to Step 11	Go to Step 15
11	Replace the heater core. Refer to <u>Heater Core Replacement</u> . Is the repair complete?	Go to Step 15	-
12	Does the odor have an oily smell?	Go to Step 13	Go to Step 15
	1. Inspect the engine compartment for any leaks. Refer to the following procedures: <ul style="list-style-type: none">• <u>Oil Leak Diagnosis</u> for the 4.6L engine or <u>Oil Leak Diagnosis</u> for the 3.8L		

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13	<p>engine</p> <ul style="list-style-type: none">• <u>Fluid Leak Diagnosis</u> for the 4T80-E transmission or <u>Fluid Leak Diagnosis</u> for the 4T65-E transmission• <u>Power Steering Fluid Leaks</u> <p>2. Repair any oil leaks.</p> <p>Is the repair complete?</p>	Go to Step 15	-
14	<p>A musty odor can be caused by mold or mildew build-up on the evaporator or the heater core or inside of the HVAC module. Refer to <u>Odor Correction</u>.</p> <p>Is the action complete?</p>	Go to Step 15	-
15	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>	System OK	Go to Step 2

REPAIR INSTRUCTIONS

ODOR CORRECTION

Eliminating Air Conditioning Odor

Odors may be emitted from the air conditioning system primarily at start up in hot, humid climates. The following conditions may cause the odor:

- Debris is present in the HVAC module.
- Microbial growth on the evaporator core

When the blower motor fan is turned on, the microbial growth may release an unpleasant musty odor into the passenger compartment. To remove odors of this type, the microbial growth must be eliminated. Perform the following procedure:

Deodorize the evaporator core using Deodorizing Aerosol Kit.

Perform the following steps in order to deodorize the A/C system:

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1. Ensure that the plenum which draws outside air into the HVAC module is clear of debris.
2. Disable the A/C compressor clutch operation by disconnecting the clutch coil electrical connector.
3. Dry the evaporator core by performing the following steps:
 1. Start the engine.
 2. Select the warmest temperature setting.
 3. Select the recirculation mode.
 4. Run the blower motor on high for 10 minutes.
4. Locate an area in the air conditioning duct between the blower motor and the evaporator core downstream of the blower motor.
5. Drill a 3.175 mm (0.125 in) hole where the hole will not interfere with or damage the following components:
 - The blower motor
 - The evaporator core
 - Any other operating part the of system
6. Wear safety goggles and latex gloves in order to perform the following actions:
 1. Select the maximum blower speed.
 2. Insert the deodorizer extension tube into the hole to the mark on the extension tube.
 3. Use short spray bursts and vary the direction of spray for a 2-3 minute period of time.
7. Shut the engine OFF. Allow the vehicle to sit for 3-5 minutes.
8. Seal the 3.175 mm (0.125 in) hole with body sealer or RTV gasket compound.
9. Start the engine.
10. Operate the blower motor on high for 15-20 minutes to dry.
11. Reconnect the A/C compressor clutch coil electrical connector.
12. Verify proper clutch operation.

To prevent the odor from returning, enabling the afterblow function with the scan tool is recommended. Refer to **Afterblow Enabling** for the automatic system.

REFRIGERANT RECOVERY AND RECHARGING

Tools Required

- **J 43600** ACR 2000 Air Conditioning Service Center. See **Special Tools**.
- **J 45037** A/C Oil Injector. See **Special Tools**.

CAUTION: Avoid breathing the A/C Refrigerant 134a (R-134a) and the lubricant vapor or the mist. Exposure may irritate the eyes, nose, and throat. Work in a well ventilated area. In order to remove R-134a from the A/C system, use service equipment that is certified to meet the requirements of SAE J 2210 (R-134a recycling equipment). If an accidental system discharge occurs, ventilate the work area before continuing service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

CAUTION: For personal protection, goggles and gloves should be worn and a clean cloth wrapped around fittings, valves, and connections when doing work that includes opening the refrigerant system. If R-134a comes in contact with any part of the body severe frostbite and personal injury can result. The exposed area should be flushed immediately with cold water and prompt medical help should be obtained.

NOTE: R-134a is the only approved refrigerant for use in this vehicle. The use of any other refrigerant may result in poor system performance or component failure.

NOTE: To avoid system damage use only R-134a dedicated tools when servicing the A/C system.

NOTE: Use only Polyalkylene Glycol Synthetic Refrigerant Oil (PAG) for internal circulation through the R-134a A/C system and only 525 viscosity mineral oil on fitting threads and O-rings. If lubricants other than those specified are used, compressor failure and/or fitting seizure may result.

NOTE: R-12 refrigerant and R-134a refrigerant must never be mixed, even in the smallest of amounts, as they are incompatible with each other. If the refrigerants are mixed, compressor failure is likely to occur. Refer to the manufacturer instructions included with the service equipment before servicing.

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ACR 2000 recovers, recycles, evacuates and recharges A/C refrigerant quickly, accurately and automatically. The unit has a display screen that contains the function controls and displays prompts that will lead the technician through the recover, recycle, evacuate and recharge operations. R-134a is recovered into and charged out of an internal storage vessel. The ACR 2000 automatically replenishes this vessel from an external source tank in order to maintain a constant 5.45-6.82 kg (12-15 lbs) of A/C refrigerant.

The ACR 2000 has a built in A/C refrigerant identifier that will test for contamination, prior to recovery and will notify the technician if there are foreign gases present in the A/C system. If foreign gases are present, the ACR 2000 will not recover the refrigerant from the A/C system.

The ACR 2000 also features automatic air purge, single pass recycling and an automatic oil drain.

Refer to the **J 43600** ACR 2000 manual for operation and setup instruction. See **Special Tools**. Always recharge the A/C System with the proper amount of R-134a. Refer to **Refrigerant System Capacities** for the correct amount.

A/C Refrigerant System Oil Charge Replenishing

If oil was removed from the A/C system during the recovery process or due to component replacement, the oil must be replenished. Oil can be injected into a charged system using **J 45037**. See **Special Tools**. For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Capacities**.

FLUSHING

Tools Required

- **J 41447** Leak Detection Dye. See **Special Tools**.
- **J 42220** Universal 12V Leak Detection Lamp. See **Special Tools**.
- **J 43600** ACR 2000 Air Conditioning Service Center. See **Special Tools**.
- **J 45268** Flush Adapter Kit. See **Special Tools**.

IMPORTANT: Flushing with the J 43600 is not intended to remove metal from the A/C system. See Special Tools.

Flushing is intended to remove the following contaminants:

- Contaminated polyalkylene glycol (PAG) oil
- Desiccant, following a desiccant bag failure

- Overcharge of PAG oil
- Refrigerant contamination

Flushing Procedure

IMPORTANT: Warmer engine or ambient temperature decreases the refrigerant recovery time during the A/C flush procedure.

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the TXV. Refer to Thermal Expansion Valve Replacement.
3. Install the J 45268-113.
4. Remove the A/C compressor. Refer to Compressor Replacement (LD8) or Compressor Replacement (L26).
5. Install the J 45268-4 to the suction hose.
6. Install the J 45268-5 to the discharge hose.

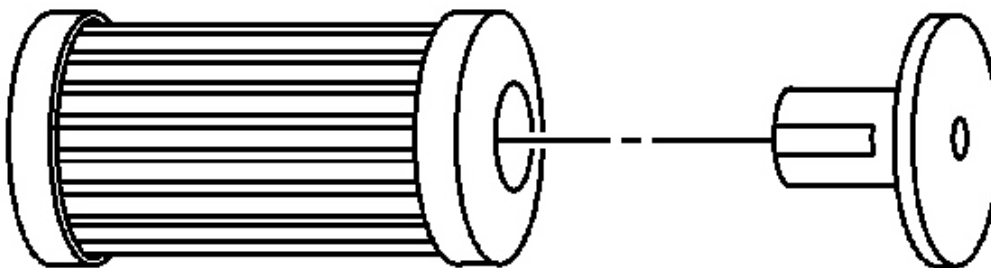


Fig. 3: View Of A/C Filter And Check Valve
Courtesy of GENERAL MOTORS CORP.

7. Forward flow refrigerant flushing is recommended for contaminated refrigerant or PAG oil.

Perform the following procedure:

IMPORTANT: The filter inside J 45268-1 is serviceable. Remove and discard the check valve from the filter.

1. Service the filter with ACDelco P/N GF 470, before each flush.

Connect J 45268-1 flush filter to the J 45268-4 flush adapter.

2. Connect the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools**.
3. Connect the red hose from **J 43600** to J 45268-5. See **Special Tools**.
8. Reverse flow refrigerant flushing is recommended for desiccant bag failure only. Perform the following procedure and replace the accumulator when the flush is complete:

IMPORTANT: The filter inside J 45268-1 is serviceable. Remove and discard the check valve from the filter.

1. Service the filter with ACDelco P/N GF 470, before each flush.
2. Connect J 45268-1 flush filter to the J 45268-5 flush adapter.
3. Connect the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools**.
4. Connect the red hose from **J 43600** to the J 45268-4. See **Special Tools**.

IMPORTANT: Close the valve on the external refrigerant tank, before starting the flush process.

9. Flush the A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools**.
10. Remove the J 45268-5 from the discharge hose.
11. Remove the J 45268-4 from the suction hose.

IMPORTANT: Flushing will remove all the PAG oil from the A/C system. The A/C system must be replenished with the correct amount of PAG oil.

12. If the removed A/C compressor will be reinstalled, perform the following procedure:
 1. Drain the PAG oil from the A/C compressor.

Rotate the compressor input shaft to assist in draining the PAG oil from the compressor.

2. Add the total system capacity of PAG oil to the A/C compressor. Refer to

Refrigerant System Capacities .

13. If the A/C compressor will be replaced after flushing the system, refer to **Compressor Oil Balancing**.

IMPORTANT: Flushing will remove the fluorescent leak detection dye from the A/C system.

14. Add one bottle of **J 41447** directly to the A/C compressor. See **Special Tools**.
15. Install the A/C compressor. Refer to **Compressor Replacement (LD8)** or **Compressor Replacement (L26)**.
16. Inspect the TXV for debris. Clean or replace as needed.
17. Install the TXV. Refer to **Thermal Expansion Valve Replacement**.
18. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
19. Leak test the fittings using **J 42220** . See **Special Tools**.

COMPRESSOR OIL BALANCING

Draining Procedure

IMPORTANT: Drain and measure as much of the refrigerant oil as possible from the removed compressor.

1. Drain the oil from both the suction and discharge ports of the removed compressor into a clean, graduated container.

Rotate the compressor shaft to assist in draining the compressor.

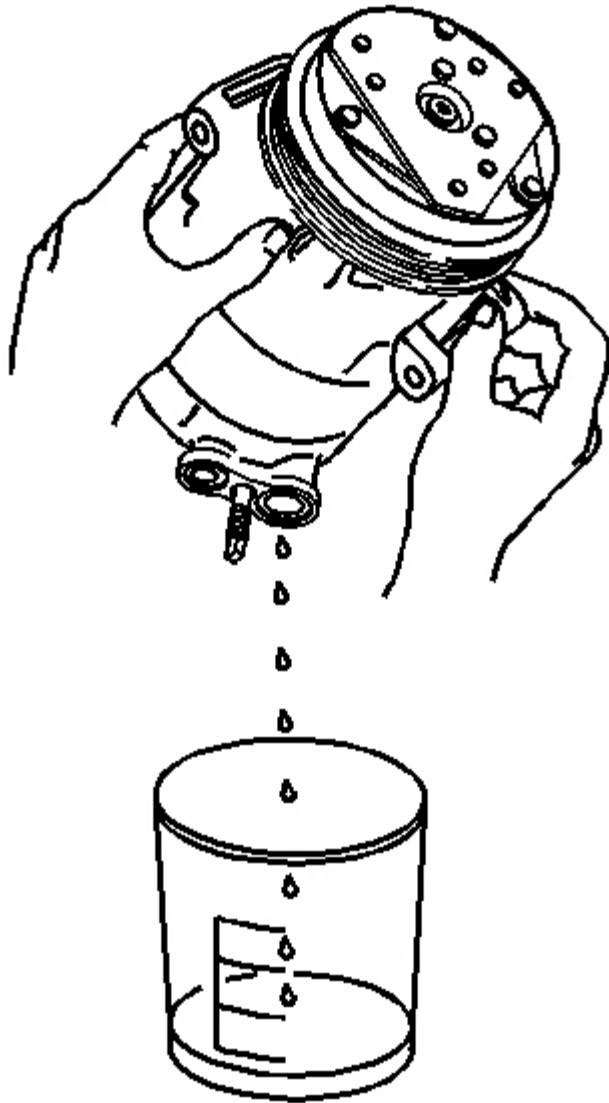


Fig. 4: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS CORP.

2. Measure and record the amount of oil drained from the removed compressor.

This measurement will be used during installation of the replacement compressor.

3. Properly discard the used refrigerant oil.

Balancing Procedure

IMPORTANT: The refrigerant oil in the A/C system must be balanced during compressor replacement.

1. The replacement compressor is shipped with 74 ml (2.5 oz.) of refrigerant oil.

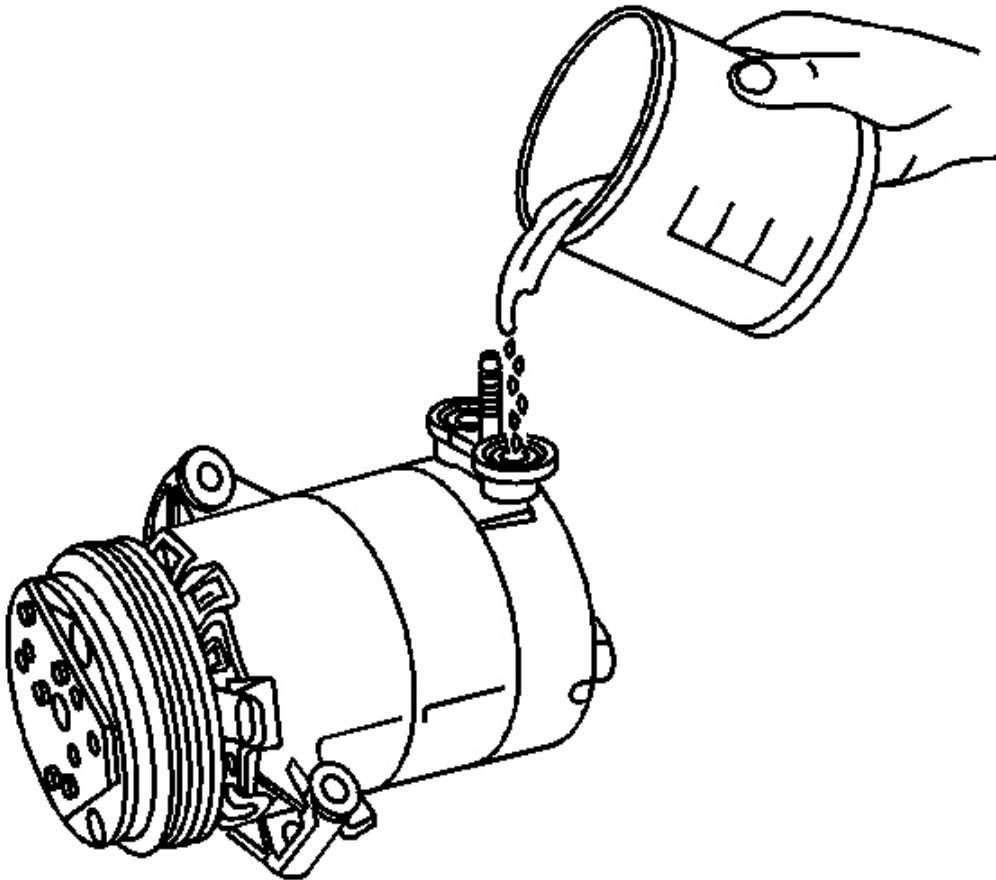


Fig. 5: Replacing Measured Compressor Oil
Courtesy of GENERAL MOTORS CORP.

2. Compare the amount of refrigerant oil recorded during compressor removal to the amount

of refrigerant oil shipped in the replacement compressor.

If the amount of refrigerant oil drained and recorded from the removed compressor is:

- Less than 74 ml (2.5 oz.)

Leave the 74 ml (2.5 oz.) in the replacement compressor.

- More than 74 ml (2.5 oz.)

Add to the compressor the difference between the 74 ml (2.5 oz.) and the amount drained.

COMPRESSOR REPLACEMENT (LD8)

Fig. 6: Removing/Installing Compressor (LD8)
Courtesy of GENERAL MOTORS CORP.

Compressor Replacement (LD8)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications**

Preliminary Procedure

1. Recover the refrigerant from the air conditioning (A/C) system. Refer to **Refrigerant Recovery and Recharging**
2. Remove the drive belt. Refer to **Drive Belt Replacement**
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle**
4. Remove the right front tire. Refer to **Tire and Wheel Removal and Installation**
5. Remove the lower air deflector. Refer to **Front Air Deflector Replacement**
6. Remove the washer solvent container. Refer to **Washer Solvent Container Replacement**
7. Remove the brake line retaining clips from the engine frame in order to allow the brake lines to move during removal of the A/C compressor.

IMPORTANT:

Seal the compressor suction and discharge ports after the hoses are removed in order to keep contaminants from entering the compressor and oil from draining out of the compressor during removal.

8. Disconnect the A/C compressor electrical connector.

1	A/C Compressor Suction Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Compressor Discharge Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor Retaining Nut Tighten: 25 N.m (18 lb ft)
6	A/C Compressor Front Retaining Bolt

	Tighten: 25 N.m (18 lb ft)
7	A/C Compressor Rear Retaining Bolt Tighten: 25 N.m (18 lb ft)
8	A/C Compressor Retaining Stud Tighten: 25 N.m (18 lb ft)
9	A/C Compressor

COMPRESSOR REPLACEMENT (L26)

Fig. 7: Removing/Installing Compressor (L26)
Courtesy of GENERAL MOTORS CORP.

Compressor Replacement (L26)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to Fastener Tightening Specifications	

Preliminary Procedure

1. Recover the refrigerant from the air conditioning (A/C) system. Refer to **Refrigerant Recovery and Recharging**
2. Remove the drive belt. Refer to **Drive Belt Replacement**

IMPORTANT:

Seal the compressor suction and discharge ports after the hoses are removed in order to keep contaminants from entering the compressor and oil from draining out of the compressor during removal.

3. Disconnect the A/C compressor electrical connector.

1	A/C Compressor Discharge Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Compressor Suction Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor Retaining Nut Tighten: 25 N.m (18 lb ft)
6	A/C Compressor Retaining Bolt (Qty: 2) Tighten: 25 N.m (18 lb ft)
7	A/C Compressor Tip: Add proper amount of PAG oil. Refer to <u>Compressor Oil Balancing</u>

SEALING WASHER REPLACEMENT

Removal Procedure

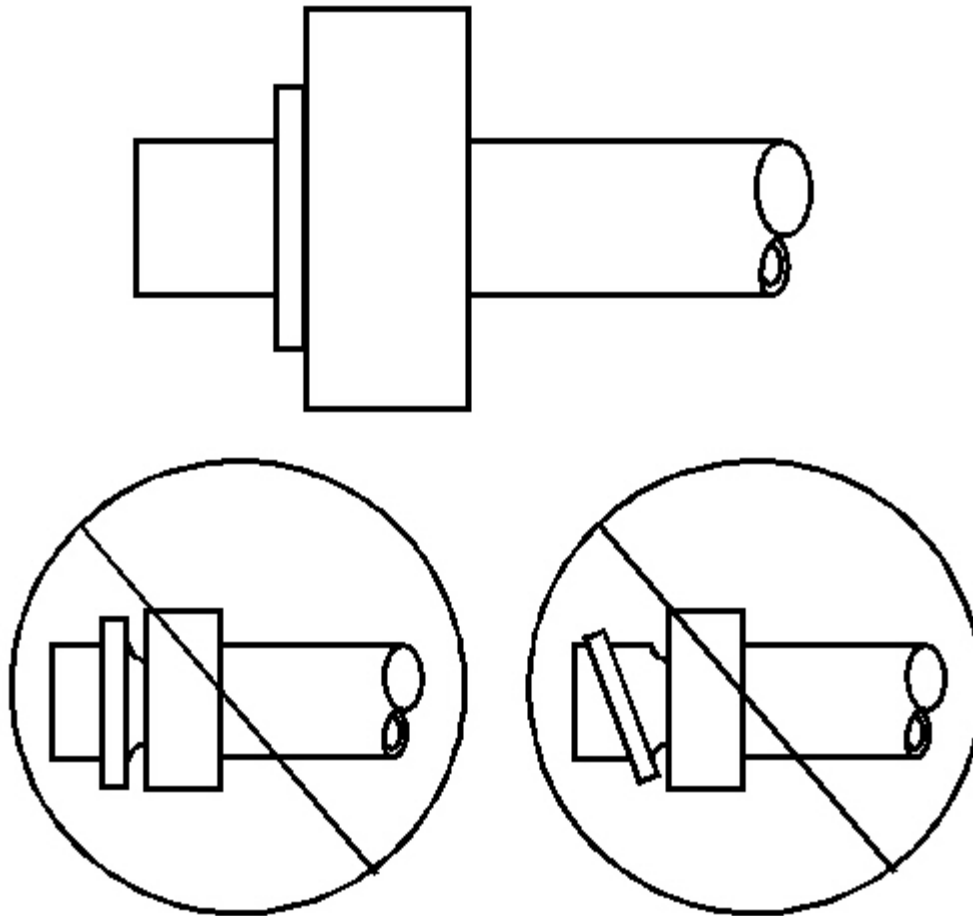


Fig. 8: Identifying Good And Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

1. Remove the seal washer from the A/C refrigerant component.

IMPORTANT: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

2. Inspect the seal washer for signs of damage to help determine the root cause of the failure.
3. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.

IMPORTANT: DO NOT reuse sealing washer.

4. Discard the sealing washer.

Installation Procedure

IMPORTANT: Flat washer type seals do not require lubrication.

1. Inspect the new seal washer for any signs of cracks, cuts, or damage.

Do not use a damaged seal washer.

2. Remove the cap or tape from the A/C refrigerant components.

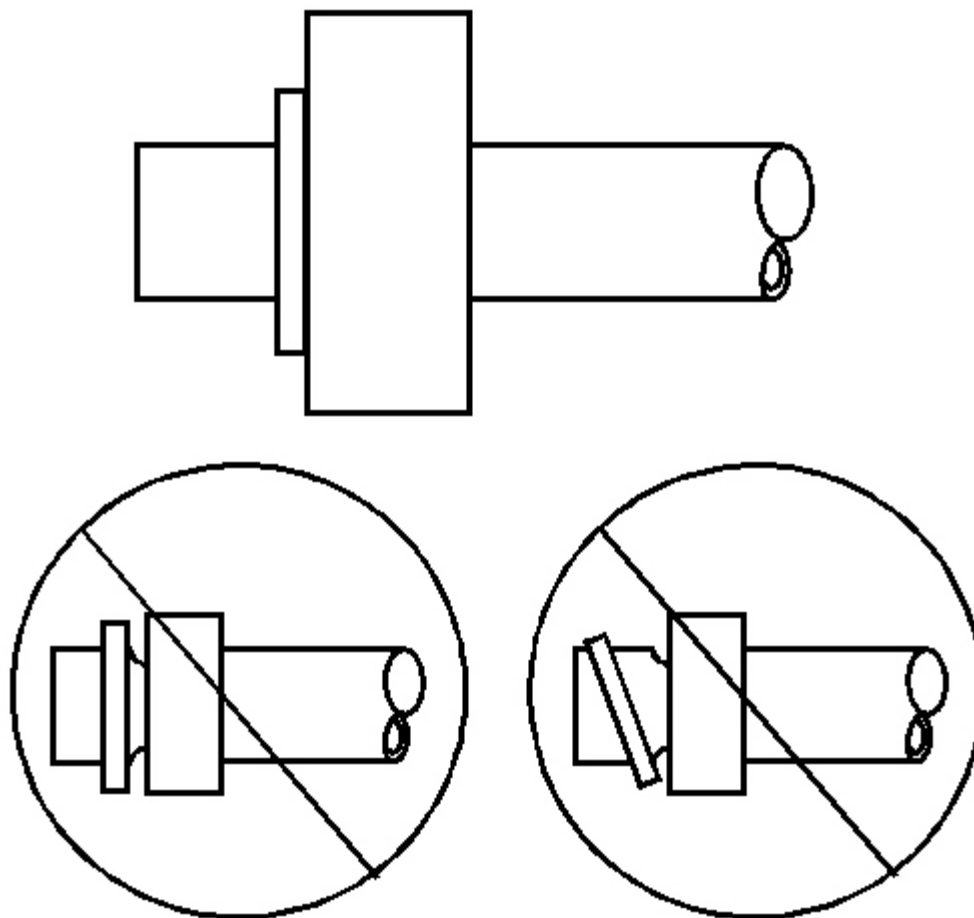


Fig. 9: Identifying Good And Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

3. Using a lint-free clean, dry cloth, clean the sealing surfaces of the A/C refrigerant components.
4. Carefully install the new seal washer onto the A/C refrigerant component.

The washer must completely bottom against the surface of the fitting.

IMPORTANT: After tightening the A/C components, there should be a slight sealing washer gap of approximately 1.2 mm (3/64 in)

between the A/C line and the A/C component.

5. Assemble the remaining A/C refrigerant components. Refer to the appropriate repair procedure.

O-RING REPLACEMENT

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure.

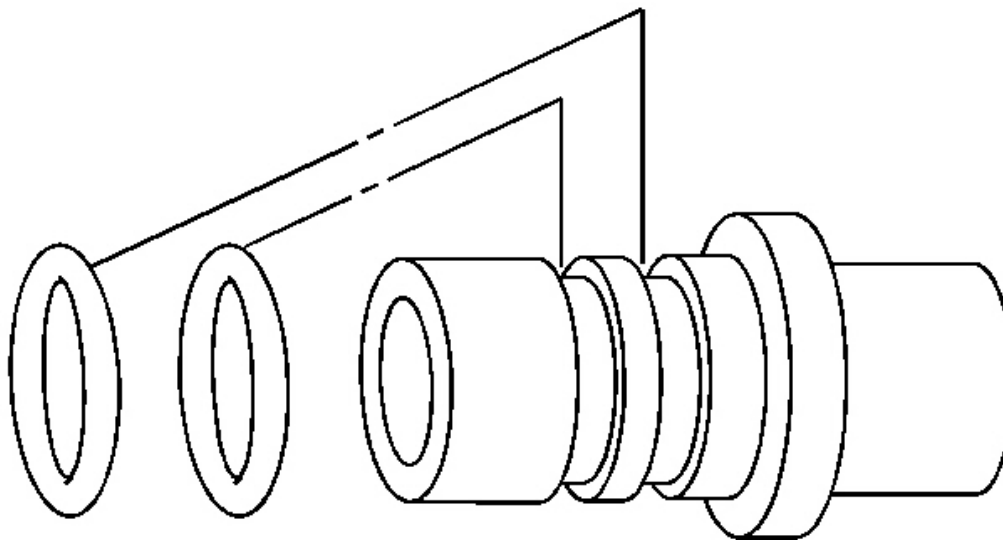


Fig. 10: Removing/Installing O-Ring Seals
Courtesy of GENERAL MOTORS CORP.

2. Remove the O-ring seals from the A/C refrigerant component.
3. Inspect the O-ring seals for signs of damage.
4. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.

IMPORTANT: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

5. Cap or tape the A/C refrigerant components.
6. Discard the O-ring seals.

Installation Procedure

1. Inspect the new O-ring seals for any sign or cracks, cuts, or damage. Replace if necessary.
2. Remove the cap or tape from the A/C refrigerant components.
3. Using a lint-free clean, dry cloth, carefully clean the sealing surfaces of the A/C refrigerant components.

IMPORTANT: DO NOT allow any of the mineral base 525 viscosity refrigerant oil on the new O-ring seal to enter the refrigerant system.

4. Lightly coat the new O-ring seals with mineral base 525 viscosity refrigerant oil.

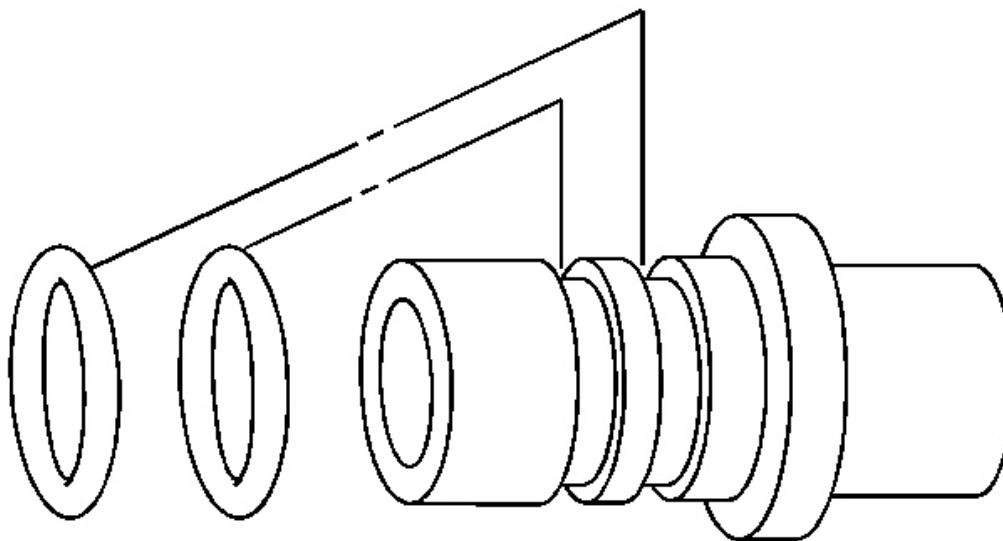


Fig. 11: Removing/Installing O-Ring Seals
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: DO NOT reuse O-ring seals.

- 5. Carefully slide the new O-ring seals onto the A/C refrigerant component.
- 6. The O-ring seals must be fully seated.
- 7. Assemble the A/C components.

Refer to the appropriate repair procedure.

DISCHARGE HOSE REPLACEMENT (L26)

Fig. 12: Locating Discharge Hose (L26)
Courtesy of GENERAL MOTORS CORP.

Discharge Hose Replacement (L26)

Callout	Component Name
<p>NOTE: Refer to <u>Fastener Notice</u></p> <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u></p> <p>Preliminary Procedure</p>	

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1. Recover the refrigerant from the air conditioning (A/C) system. Refer to **Refrigerant Recovery and Recharging**
2. Remove the front sight shield. Refer to **Front Compartment Sight Shields Replacement**

IMPORTANT:

Seal the A/C system ports after the hose is removed in order to keep A/C system from being contaminated.

3. Disconnect the A/C compressor and condenser hose electrical connector.

1	A/C Compressor And Condenser Hose Retaining Bolt Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Compressor And Condenser Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor And Condenser Hose Tip: Leak test the fittings using J 39400-A . See <u>Special Tools</u> .

DISCHARGE HOSE REPLACEMENT (LD8)

Fig. 13: Identifying Discharge Hose (LD8)
Courtesy of GENERAL MOTORS CORP.

Discharge Hose Replacement (LD8)

Callout	Component Name
<p>NOTE: Refer to <u>Fastener Notice</u></p> <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u></p> <p>Preliminary Procedure</p> <ol style="list-style-type: none">1. Recover the refrigerant from the air conditioning (A/C) system. Refer to <u>Refrigerant Recovery and Recharging</u>2. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>3. Remove the front air deflector. Refer to <u>Front Air Deflector Replacement</u> <p>IMPORTANT: Seal the A/C system ports after the hose is removed in order to keep A/C system from being contaminated.</p>	

4. Disconnect the A/C compressor and condenser hose electrical connector.	
1	A/C Compressor And Condenser Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Compressor And Condenser Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor And Condenser Hose Tip: Leak test the fittings using J 39400-A . See <u>Special Tools</u> .

SUCTION HOSE REPLACEMENT (L26)

Fig. 14: Identifying Suction Hose (L25)
Courtesy of GENERAL MOTORS CORP.

Suction Hose Replacement (L26)

Callout	Component Name
Preliminary Procedure	
1. Recover the refrigerant from the air conditioning (A/C) system. Refer to Refrigerant	

Recovery and Recharging

2. Remove the front compartment sight shield. Refer to **Front Compartment Sight Shields Replacement** .

IMPORTANT:

Seal the A/C system ports after the hose is removed in order to keep A/C system from being contaminated.

3. Remove the discharge hose nut and hose from the compressor.

1	A/C Compressor Hose Retaining Nut NOTE: Refer to <u>Fastener Notice</u> . Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Compressor Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor Hose Tip: Leak test the fittings using J 39400-A . See <u>Special Tools</u> .

SUCTION HOSE REPLACEMENT (LD8)

Fig. 15: Identifying Suction Hose (LD8)
Courtesy of GENERAL MOTORS CORP.

Suction Hose Replacement (LD8)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure <ol style="list-style-type: none">Recover the refrigerant from the air conditioning (A/C) system. Refer to <u>Refrigerant Recovery and Recharging</u>Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>Remove the front air deflector. Refer to <u>Front Air Deflector Replacement</u> IMPORTANT: Seal the A/C system ports after the hose is removed in order to keep A/C system from being contaminated. <ol style="list-style-type: none">Disconnect the A/C compressor and condenser hose electrical connector.	
1	A/C Compressor Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to Sealing Washer

	<u>Replacement</u>
3	A/C Compressor Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
4	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
5	A/C Compressor Hose Tip: Leak test the fittings using J 39400-A . See <u>Special Tools</u> .

EVAPORATOR HOSE ASSEMBLY REPLACEMENT

Fig. 16: Identifying Evaporator Hose Assembly
Courtesy of GENERAL MOTORS CORP.

Evaporator Hose Assembly Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications**

Preliminary Procedure

1. Recover the refrigerant from the air conditioning (A/C) system. Refer to **Refrigerant Recovery and Recharging**

IMPORTANT:

Seal the A/C system ports after the hose is removed in order to keep A/C system from being contaminated.

2. Remove the injector sight shield. Refer to **Fuel Injector Sight Shield Replacement**
3. Remove the upper tie bar. Refer to **Front End Upper Tie Bar Replacement** .

1	A/C Evaporator Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
2	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
3	A/C Evaporator Hose Retaining Bolt Tighten: 6 N.m (53 lb in)
4	A/C Evaporator Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
5	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
6	A/C Evaporator Hose Retaining Nut Tighten: 16 N.m (12 lb ft)
7	Sealing Washer Tip: Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>
8	A/C Evaporator hose Assembly. Tip: Leak test the fittings using J 39400-A . See <u>Special Tools</u> .

Fig. 17: Locating Air Conditioning (A/C) Refrigerant Filter
Courtesy of GENERAL MOTORS CORP.

Air Conditioning (A/C) Refrigerant Filter Replacement

Callout	Component Name
Preliminary Procedure	
<ol style="list-style-type: none">1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>2. Remove the front compartment sight shield. Refer to <u>Front Compartment Sight Shields Replacement</u> .3. Remove the discharge hose nut from the condenser.4. Remove the discharge hose from the condenser. Refer to <u>Discharge Hose Replacement (L26)</u> or <u>Discharge Hose Replacement (LD8)</u>.	
1	A/C Line Nut NOTE: Refer to <u>Fastener Notice</u> .

	Tip: Remove and discard sealing washer. Refer to <u>Sealing Washer Replacement</u> .
	Tighten: 9 N.m (80 lb in)
2	Refrigerant Filter

THERMAL EXPANSION VALVE REPLACEMENT

Fig. 18: Locating Thermal Expansion Valve
Courtesy of GENERAL MOTORS CORP.

Thermal Expansion Valve Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Remove the HVAC Module. Refer to HVAC Module Assembly Replacement	

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2. Remove the heater core. Refer to **Heater Core Replacement**

1	A/C Evaporator Tube Bolt (Qty: 2) Tighten: 16 N.m (12 lb ft)
2	Thermal Expansion Valve Bolt (Qty: 2) Tighten: 16 N.m (12 lb ft)
3	Thermal Expansion Valve O-ring Tip: Remove and discard the O-rings. Refer to <u>O-Ring Replacement</u>
4	A/C Evaporator Tube O-ring Tip: Remove and discard the O-rings. Refer to <u>O-Ring Replacement</u>
5	A/C Evaporator Tube
6	A/C Evaporator Tube Bracket
7	Thermal Expansion Valve

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (LD8)

Fig. 19: View Of Air Conditioning (A/C) Refrigerant Pressure Sensor (LD8)
Courtesy of GENERAL MOTORS CORP.

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LD8)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>	
2. Remove the front air deflector. Refer to <u>Front Air Deflector Replacement</u>	
3. Disconnect the A/C pressure sensor electrical connector.	

1	O-ring Tip: Remove and discard the O-ring. Refer to <u>O-Ring Replacement</u>
2	A/C Refrigerant Pressure Sensor Tighten: 5 N.m (44 lb in)

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (L26)

Fig. 20: Locating Air Conditioning (A/C) Refrigerant Pressure Sensor (L26)
Courtesy of GENERAL MOTORS CORP.

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (L26)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>	

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2. Remove the front air deflector. Refer to **Front Air Deflector Replacement**
3. Disconnect the A/C pressure sensor electrical connector.

1	O-ring Tip: Remove and discard the O-ring. Refer to <u>O-Ring Replacement</u>
2	A/C Refrigerant Pressure Sensor Tighten: 5 N.m (44 lb in)

CONDENSER REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools**.

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the front compartment sight shield. Refer to **Front Compartment Sight Shields Replacement** .
3. Remove the hood latch support. Refer to **Hood Latch Support Replacement** .

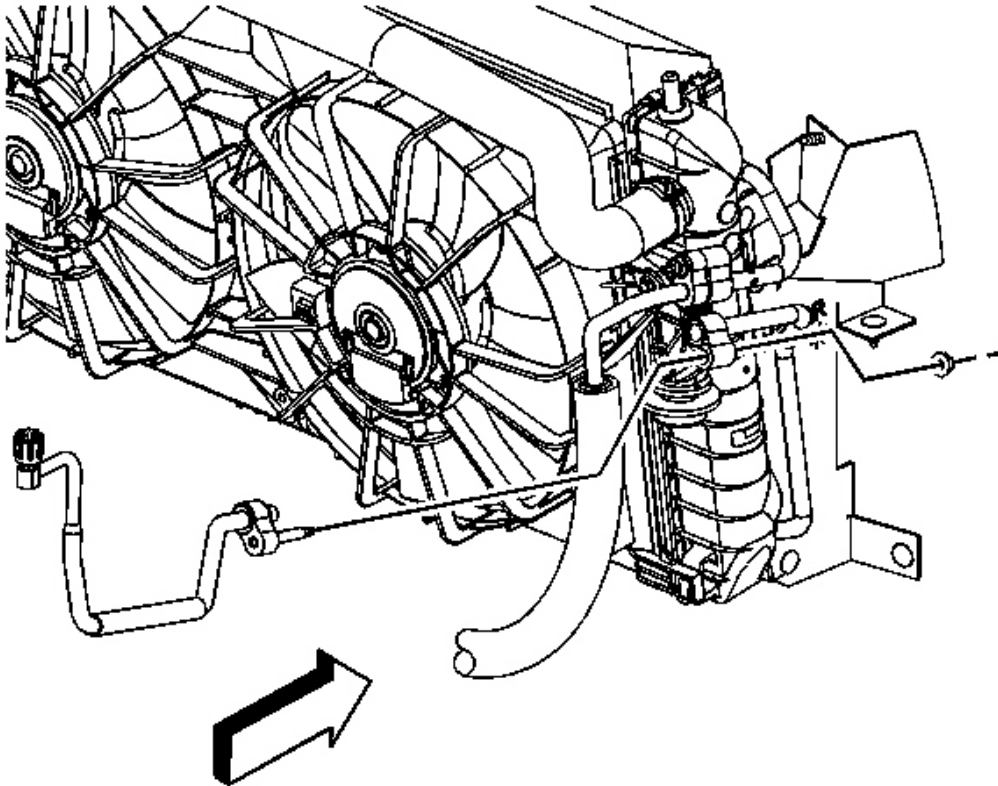


Fig. 21: Removing/Installing Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

4. Remove the discharge hose nut from the condenser.
5. Remove the liquid line from the condenser.

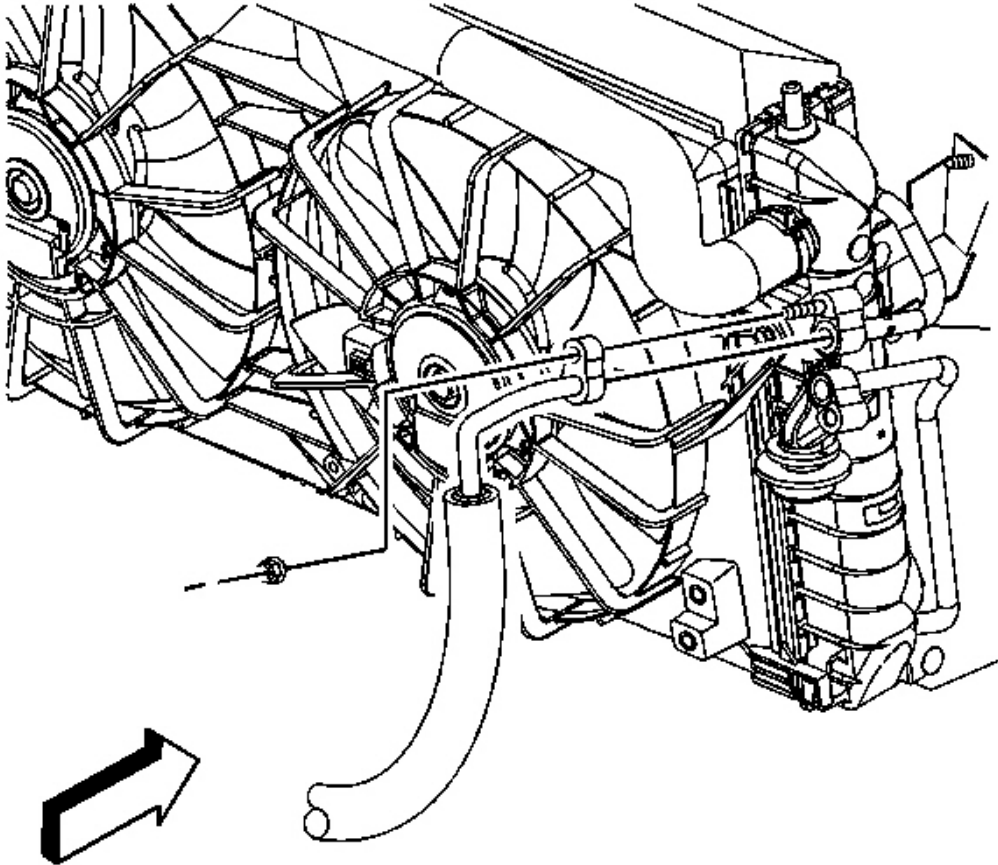


Fig. 22: Removing/Installing Suction Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

6. Remove the suction hose nut from the condenser.
7. Remove the suction hose from the condenser.
8. Remove and discard the sealing washers. Refer to **Sealing Washer Replacement**.

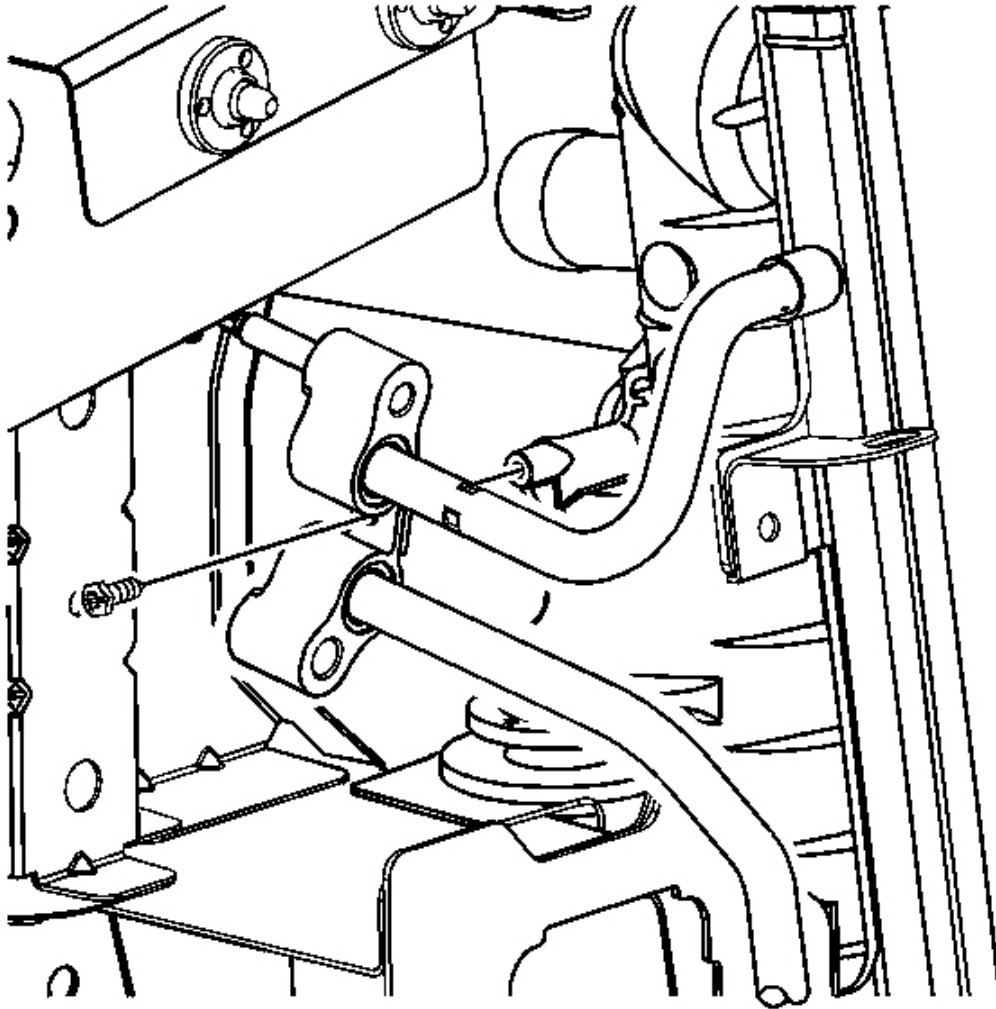


Fig. 23: Removing/Installing Condenser Lines
Courtesy of GENERAL MOTORS CORP.

9. Remove the condenser lines to radiator mounting bolt.

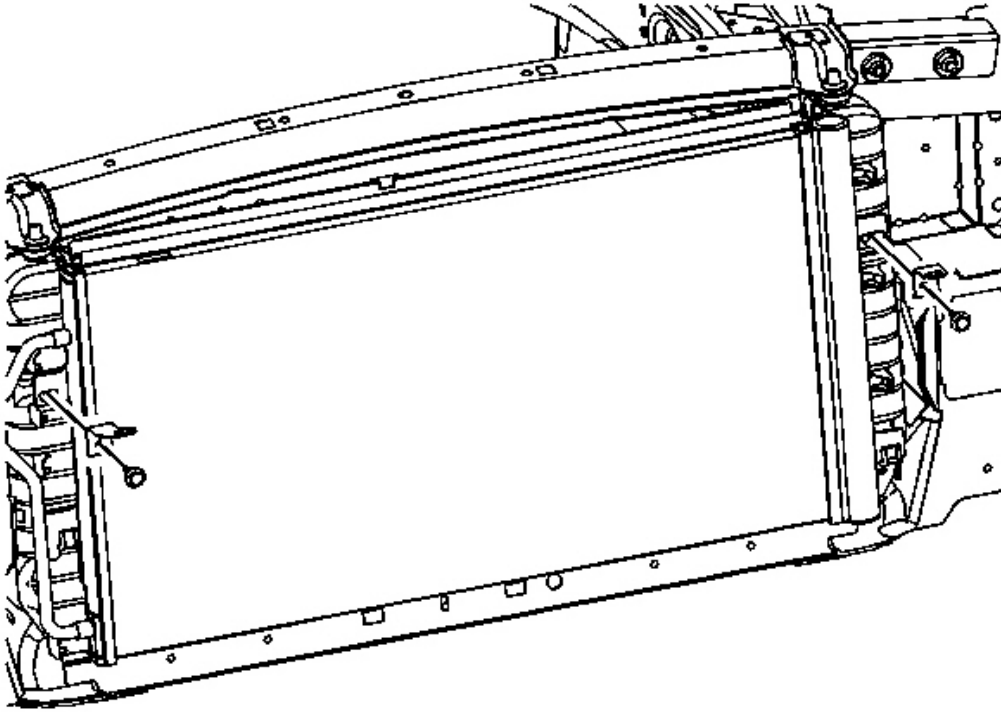


Fig. 24: View Of Condenser & Bolts
Courtesy of GENERAL MOTORS CORP.

10. Remove the condenser mounting bolts.

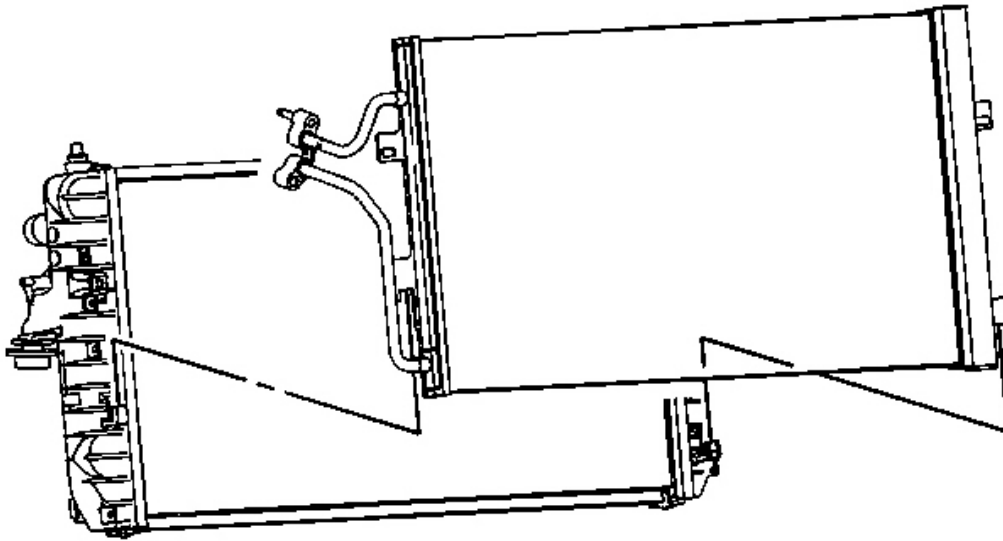


Fig. 25: Removing/Installing Condenser To/From Radiator Retainer
Courtesy of GENERAL MOTORS CORP.

11. Remove the condenser from the radiator retainer.
12. Remove the condenser from the vehicle.

Installation Procedure

IMPORTANT: If replacing the condenser, add refrigerant oil to condenser.
Refer to Refrigerant System Capacities.

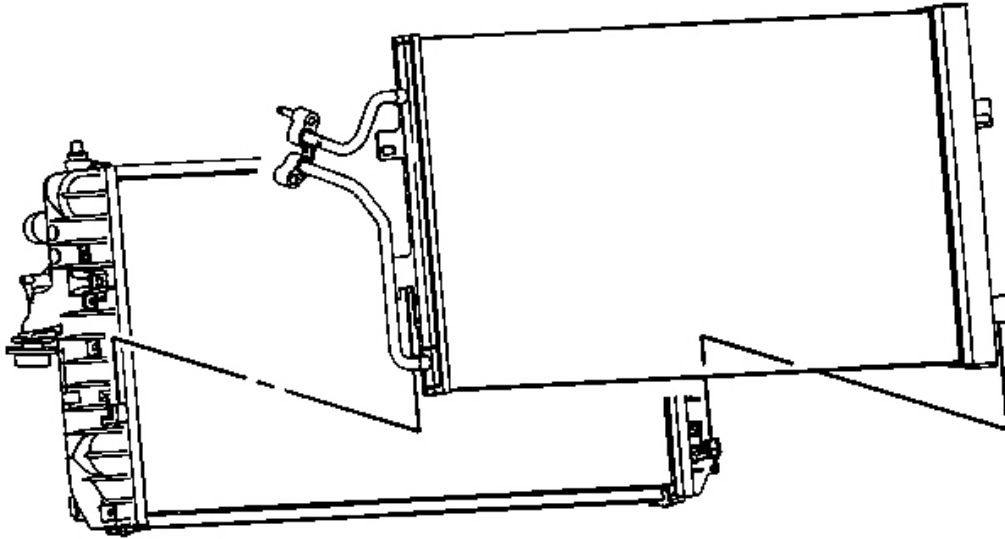


Fig. 26: Removing/Installing Condenser To/From Radiator Retainer
Courtesy of GENERAL MOTORS CORP.

1. Install the condenser into the radiator retainer.

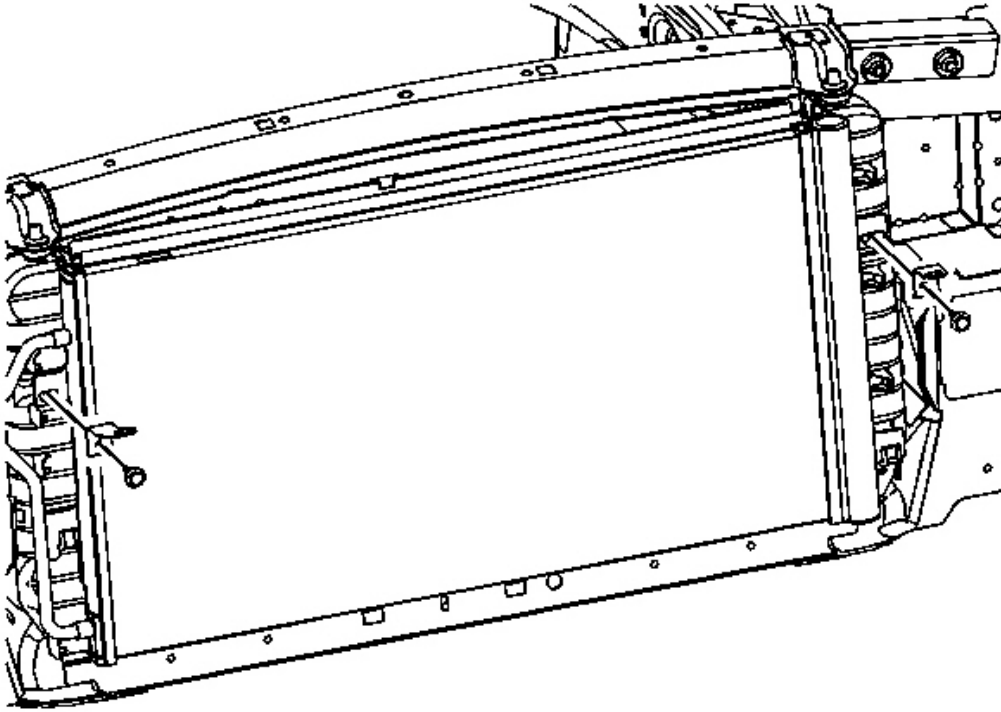


Fig. 27: View Of Condenser & Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Install the condenser mounting bolts.

Tighten: Tighten the bolts to 9 N.m (80 lb in).

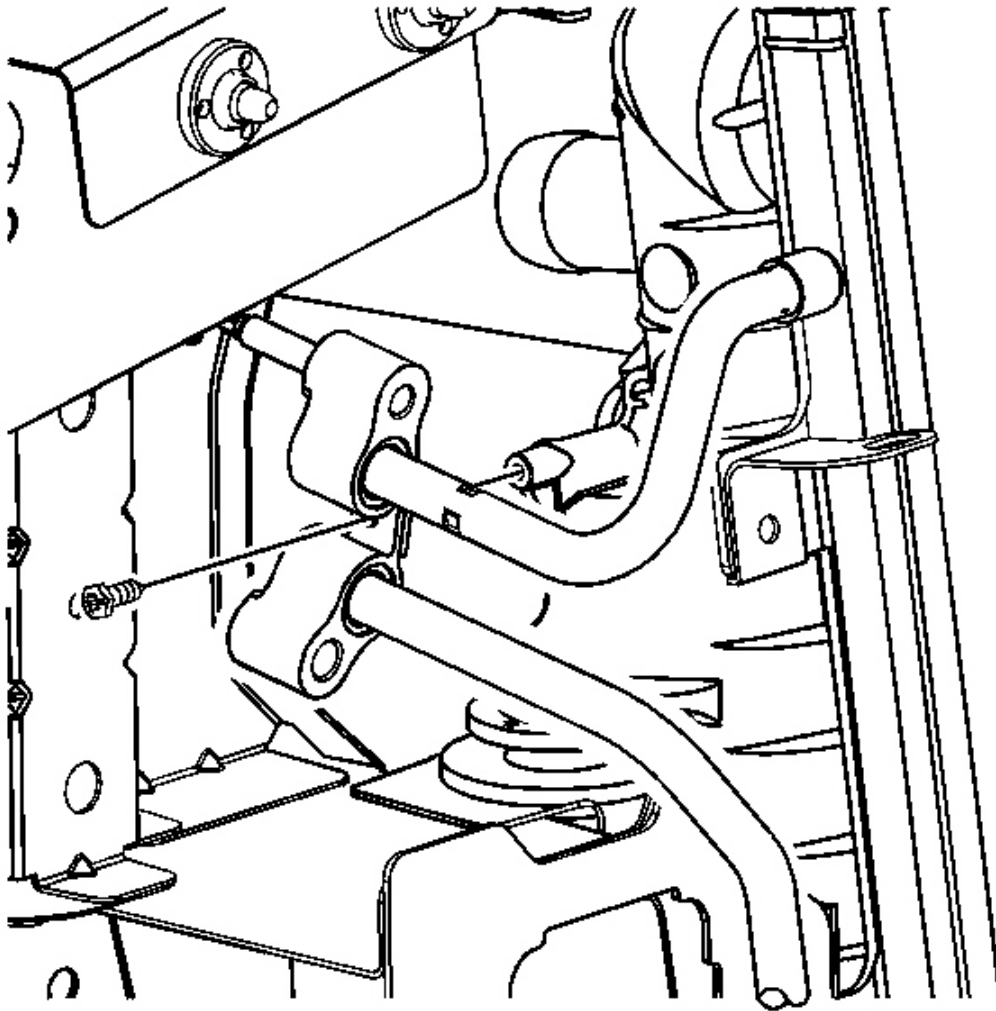


Fig. 28: Removing/Installing Condenser Lines
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Reuse the condenser line mounting bracket.

3. Install the condenser line to radiator mounting bolt.

Tighten: Tighten the bolts to 6 N.m (53 lb in).

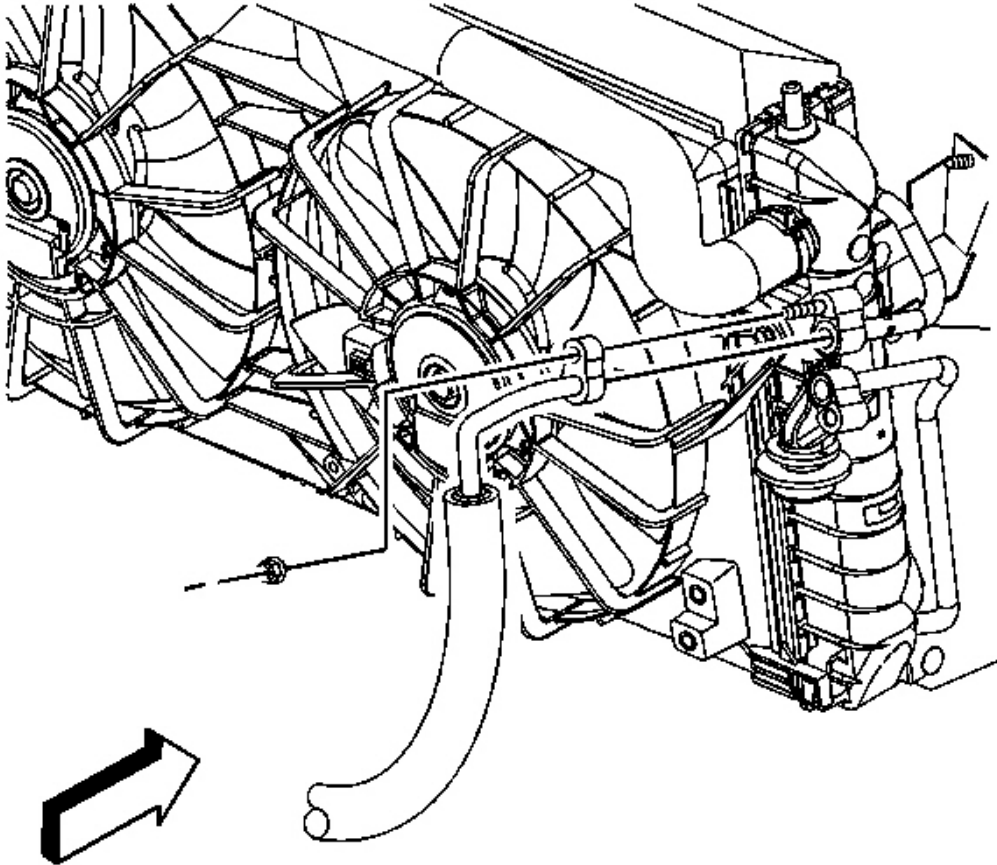


Fig. 29: Removing/Installing Suction Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

4. Install new sealing washers. Refer to Sealing Washer Replacement.
5. Install the suction hose to the condenser.
6. Install the suction hose nut to the condenser.

Tighten: Tighten the nut to 16 N.m (12 lb ft).

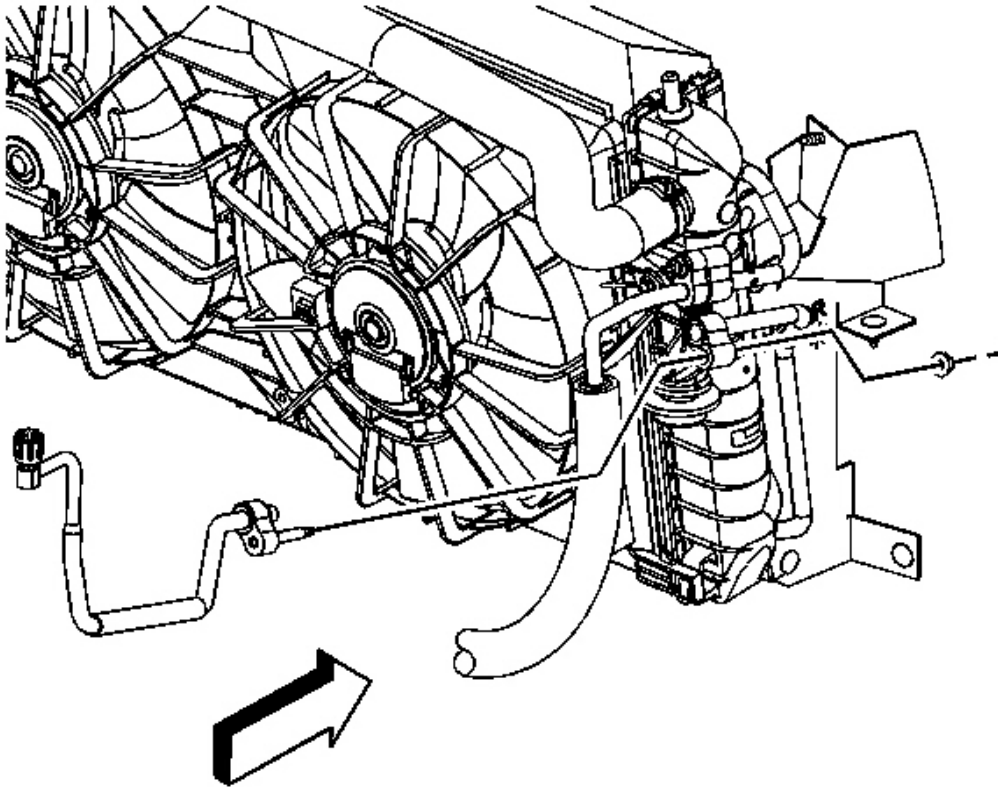


Fig. 30: Removing/Installing Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

7. Install the liquid line to the condenser.
8. Install the liquid line nut to the condenser.

Tighten: Tighten the nut to 16 N.m (12 lb ft).

9. Install the hood latch bracket. Refer to **Hood Latch Support Replacement** .
10. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
11. Leak test the fittings using the **J 39400-A** . See **Special Tools**.
12. Install the front compartment sight shield. Refer to **Front Compartment Sight Shields Replacement** .

Fig. 31: View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

HVAC Module Assembly Replacement

Callout	Component Name
<p>NOTE: Refer to <u>Fastener Notice</u></p> <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u></p> <p>Preliminary Procedure</p> <ol style="list-style-type: none">1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u>2. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>3. Remove the evaporator tube from the thermal expansion valve. Refer to <u>Evaporator Hose Assembly Replacement</u>4. Remove the heater hoses from the heater core. Refer to <u>Heater Hoses Replacement (LD8)</u>5. Remove the instrument panel carrier. Refer to <u>Instrument Panel Carrier</u>	

Replacement

6. Disconnect the HVAC module assembly electrical connectors.

1	Nut, HVAC Module Assembly Tip: Tighten the nuts in sequence. Tighten: 9 N.m (80 lb in)
2	Module, HVAC Assembly

EVAPORATOR CORE REPLACEMENT

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Fig. 32: Removing/Installing Evaporator Core
Courtesy of GENERAL MOTORS CORP.

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Evaporator Core Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
<ol style="list-style-type: none">1. Remove the HVAC module assembly. Refer to <u>HVAC Module Assembly Replacement</u>2. Remove the heater core. Refer to <u>Heater Core Replacement</u>3. Remove the thermal expansion valve. Refer to <u>Thermal Expansion Valve Replacement</u>4. Remove the air inlet housing assembly. Refer to <u>Air Inlet Assembly Replacement</u>	
1	A/C Evaporator Case Screw (Qty: 7) Tighten: 1.0 N.m (9 lb in)
2	A/C Evaporator Case, Upper
3	Evaporator Core

HEATER HOSES REPLACEMENT (LD8)

Fig. 33: Removing/Installing Heater Hoses (LD8)
Courtesy of GENERAL MOTORS CORP.

Heater Hoses Replacement (LD8)

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u>	
2. Remove the air cleaner intake duct. Refer to <u>Air Cleaner Assembly Replacement</u>	
1	Heater Inlet and Outlet Pipe Assembly Tip: Using J 37097-A

HEATER INLET HOSE REPLACEMENT (L26)

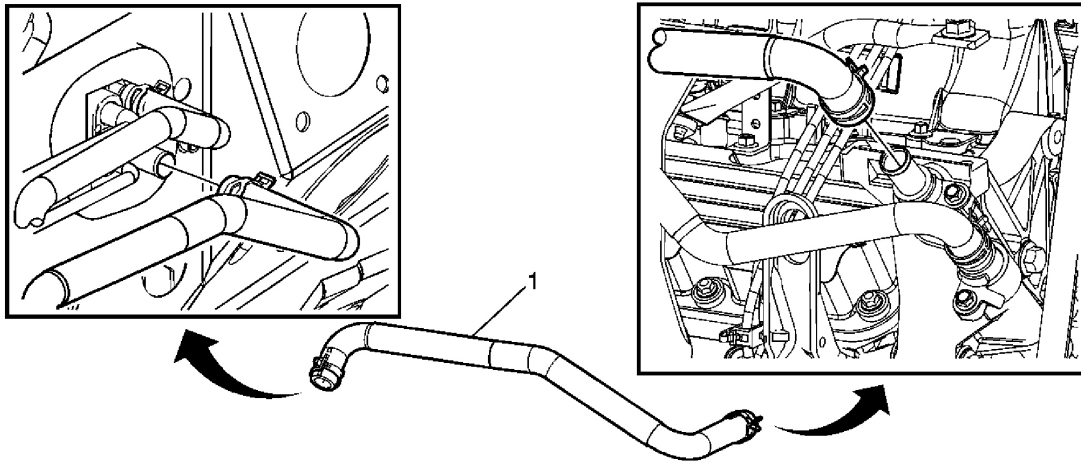


Fig. 34: Removing/Installing Heater Hoses (L26)

Courtesy of GENERAL MOTORS CORP.

Heater Inlet Hose Replacement (L26)

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u>	
2. Remove the fuel injector sight shield. Refer to <u>Intake Manifold Cover Replacement</u>	
1	Heater Hose - Inlet Tip: Use J 38185

HEATER OUTLET HOSE REPLACEMENT (L26)

Fig. 35: Removing/Installing Heater Outlet Hose (L26)
Courtesy of GENERAL MOTORS CORP.

Heater Outlet Hose Replacement (L26)

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u>	
2. Remove the fuel injector sight shield. Refer to <u>Intake Manifold Cover Replacement</u>	
1	Heater Hose - Outlet Tip: Use J 38185

HEATER INLET PIPE ADAPTER REPLACEMENT (L26)

Fig. 36: Removing/Installing Inlet Pipe Adapter (L26)
Courtesy of GENERAL MOTORS CORP.

Heater Inlet Pipe Adapter Replacement (L26)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u>	
2. Remove the fuel injector sight shield. Refer to <u>Intake Manifold Cover Replacement</u>	
3. Remove the heater hose from the heater inlet adaptor. Refer to <u>Heater Inlet Hose</u>	

<u>Replacement (L26)</u>	
1	Heater Inlet Pipe Adaptor Bolt Tighten: 10 N.m (89 lb in)
2	Heater Inlet Pipe Adaptor O-Ring (Qty: 2)
3	Heater Inlet Pipe Adaptor

HEATER OUTLET PIPE ADAPTER REPLACEMENT (L26)

Fig. 37: Identifying Heater Outlet Pipe Adapter (L26)
Courtesy of GENERAL MOTORS CORP.

Heater Outlet Pipe Adapter Replacement (L26)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	

<div>1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u></div> <div>2. Remove the fuel injector sight shield. Refer to <u>Intake Manifold Cover Replacement</u></div> <div>3. Remove the heater hose from the heater outlet adaptor. Refer to <u>Heater Outlet Hose Replacement (L26)</u></div>	
1	Heater Outlet Pipe Adaptor Bolt Tighten: 10 N.m (89 lb in)
2	Heater Outlet Pipe Adaptor O-Ring (Qty: 2)
3	Heater Outlet Pipe Adaptor

PASSENGER COMPARTMENT AIR FILTER REPLACEMENT

Fig. 38: Locating Passenger Compartment Air Filter
Courtesy of GENERAL MOTORS CORP.

Passenger Compartment Air Filter Replacement

Callout	Component Name

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications.**
Preliminary Procedure:
Remove the passenger compartment air filter access cover.

1	Compartment Filter
---	--------------------

AIR INLET ASSEMBLY REPLACEMENT

Fig. 39: View Of Air Inlet Assembly
Courtesy of GENERAL MOTORS CORP.

Air Inlet Assembly Replacement

Callout	Component Name
NOTE:	

Refer to Fastener Notice

Fastener Tightening Specifications: Refer to Fastener Tightening Specifications

Preliminary Procedure

- 1. Remove the HVAC Module. Refer to HVAC Module Assembly Replacement
- 2. Disconnect the recirculation actuator electrical connector.

1	Recirculation Actuator Screw (Qty: 2) Tighten: 1.0 N.m (9 lb in)
2	Recirculation Actuator
3	Air Inlet Housing Door Lever
4	Air Inlet Housing Screw (Qty: 2) Tighten: 1.0 N.m (9 lb in)
5	Air Inlet Housing Door
6	Air Inlet Housing

BLOWER MOTOR RESISTOR REPLACEMENT


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Fig. 40: Locating Blower Motor Resistor
Courtesy of GENERAL MOTORS CORP.

Blower Motor Resistor Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the right hand closeout insulator. Refer to <u>Instrument Panel Insulator Panel Replacement - Right Side</u> . 2. Disconnect the blower motor resistor electrical connector.	
1	Blower Motor Resistor Screw NOTE: Refer to <u>Fastener Notice</u> . Tighten: 1.0 N.m (9 lb in)
2	Blower Motor Resistor

BLOWER MOTOR REPLACEMENT

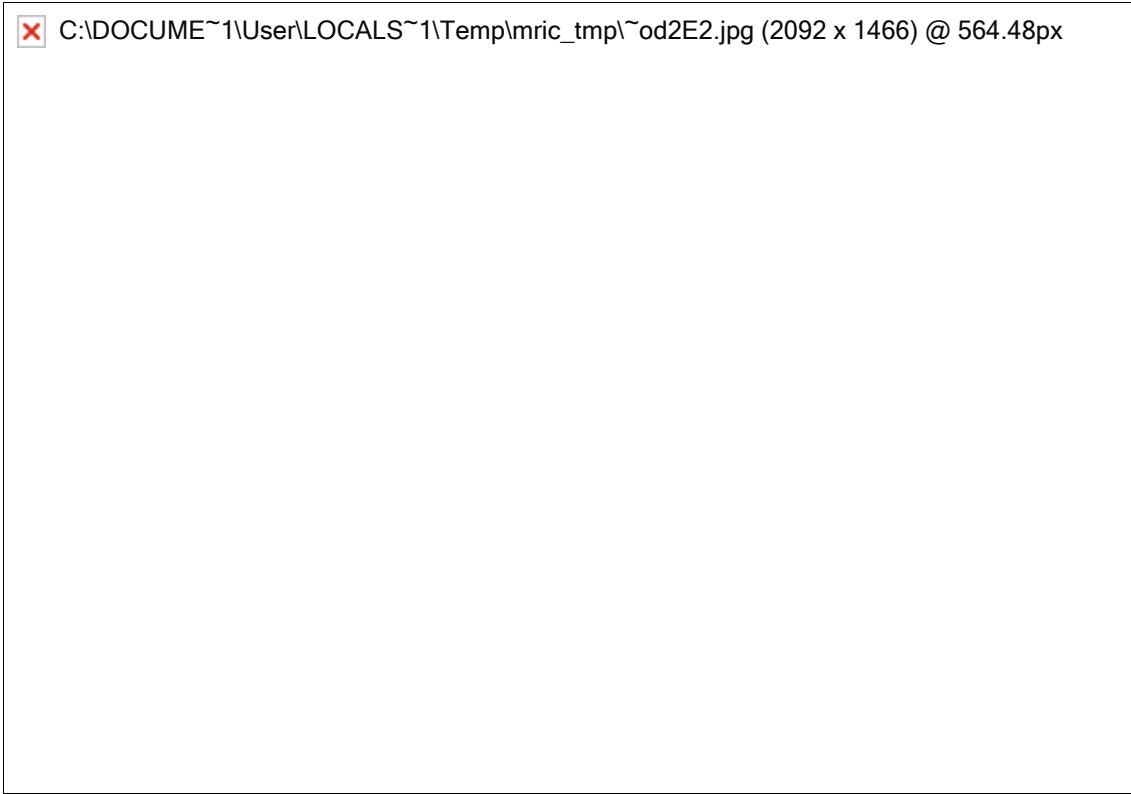


Fig. 41: Removing/Installing Blower Motor

Courtesy of GENERAL MOTORS CORP.

Blower Motor Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Remove the right hand closeout insulator panel. Refer to <u>Instrument Panel Insulator Panel Replacement - Right Side</u>	
2. Disconnect the blower motor electrical connector.	
1	Blower Motor Screw (Qty: 3) Tighten: 1.0 N.m (9 lb in)
2	Blower Motor

SIDE WINDOW AIR OUTLET REPLACEMENT

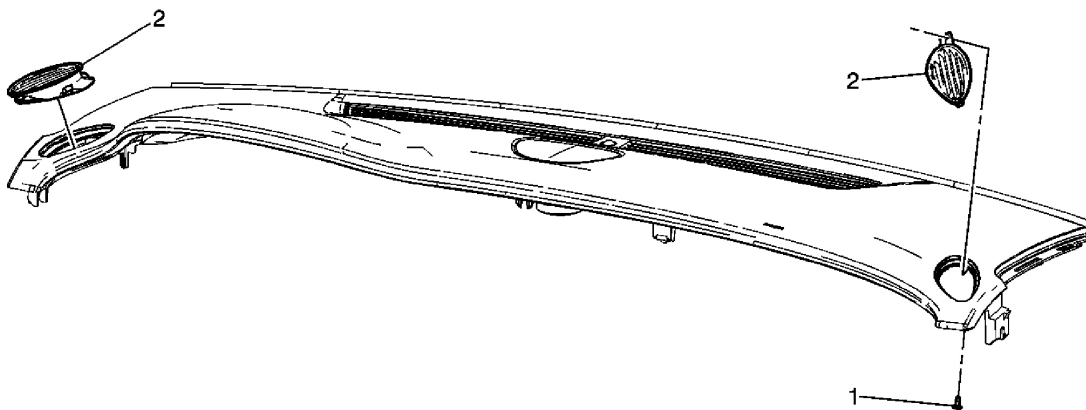


Fig. 42: Identifying Side Window Air Outlet
Courtesy of GENERAL MOTORS CORP.

Side Window Air Outlet Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure:	

Remove the instrument panel upper trim pad. Refer to **Instrument Panel Upper Trim Pad Replacement** .

1	Grille Side Window Defogger Outlet Screw Tighten: 1.0 N.m (9 lb in)
2	Grille Side Window Defogger Outlet

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE

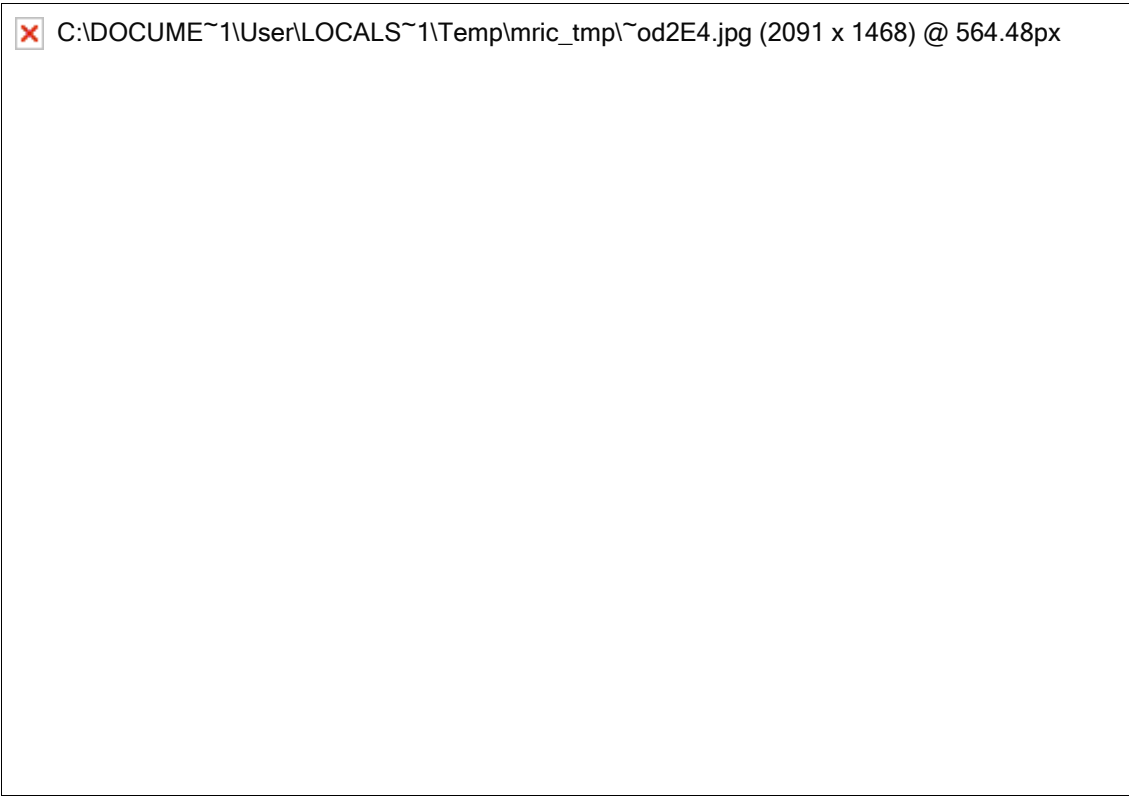


Fig. 43: Identifying Instrument Panel Outer Air Outlet - Left Side
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Outer Air Outlet Replacement - Left Side

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
1	Instrument Panel Outer Air Outlet - Left Tip: 1. Using a flat-bladed tool release, the headlamp bezel assembly from the instrument panel.

	2. Disconnect the headlamp electrical connector.
2	Using a flat-bladed tool release, the air outlet from the headlamp bezel.

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT



Fig. 44: Identifying Instrument Panel Center Air Outlet
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Center Air Outlet Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> Preliminary Procedure: Remove the instrument panel trim plate. Refer to <u>Instrument Panel Trim Plate Replacement</u>	
1	Instrument Panel Center Air Outlet, LH Tip: Using a flat-bladed tool release the tab securing the center air outlet to the instrument panel trim plate.
2	Instrument Panel Center Air Outlet, RH Tip: Using a flat-bladed tool release the tab securing the center air outlet to the instrument panel trim plate.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE



Fig. 45: Identifying Instrument Panel Outer Air Outlet - Right Side
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Outer Air Outlet Replacement - Right Side

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
1	Instrument Panel Outer Air Outlet - Right Tip: Using a flat-bladed tool release, the outer air outlet from the instrument panel.

INSTRUMENT PANEL OUTER AIR OUTLET UPPER DUCT REPLACEMENT - LEFT SIDE



Fig. 46: Removing/Installing Instrument Panel Outer Air Outlet Upper Duct - Left Side
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Outer Air Outlet Upper Duct Replacement - Left Side

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> Preliminary Procedure: Remove the instrument panel lower trim panel. Refer to <u>Instrument Panel Lower Trim Panel Replacement</u>	
1	Air Distributor Outer Duct - Left Screw (Qty: 1) Tighten: 1.0 N.m (9 lb in)

INSTRUMENT PANEL OUTER AIR OUTLET UPPER DUCT REPLACEMENT - RIGHT SIDE



Fig. 47: Removing/Installing Instrument Panel Outer Air Outlet Upper Duct - Right Side
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Outer Air Outlet Upper Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure: Remove the instrument panel lower trim panel. Refer to <u>Instrument Panel Lower Trim Panel Replacement</u>	
1	Air Distributor Outer Duct - Right, Screw NOTE: Refer to <u>Fastener Notice</u>

	Tighten: 1.0 N.m (9 lb in)
2	Air Distributor Outer Duct - Right

DEFROSTER AIR OUTLET DUCT REPLACEMENT

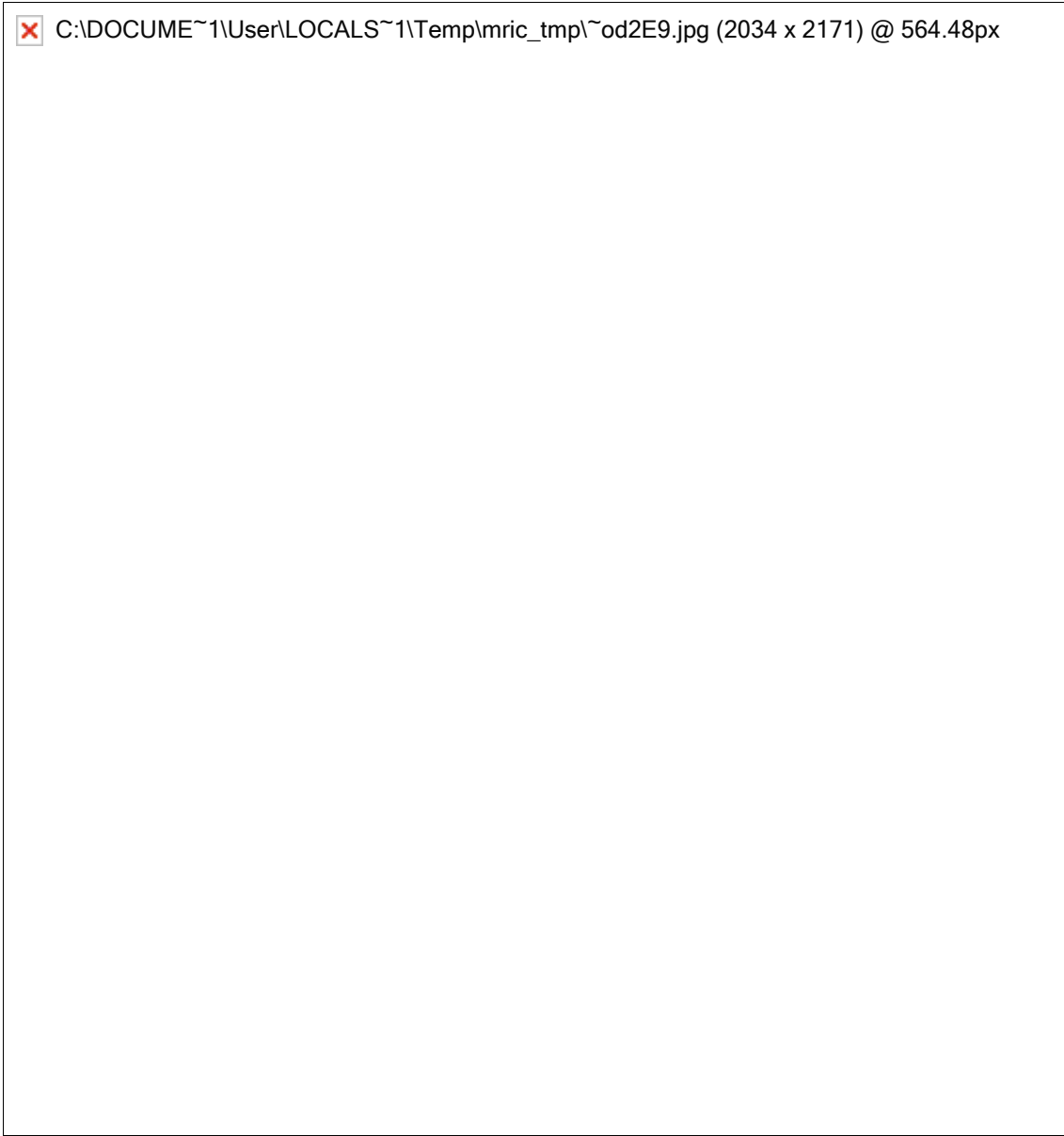


Fig. 48: Removing/Installing Defroster Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

Defroster Air Outlet Duct Replacement

Callout	Component Name

NOTE:
Refer to Fastener Notice

Fastener Tightening Specifications: Refer to Fastener Tightening Specifications
Preliminary Procedure: Remove the instrument panel lower trim panel.
Refer to Instrument Panel Lower Trim Panel Replacement

1	Windshield Defogger Nozzle Duct, Screw (Qty: 2) Tip: Remove the instrument panel carrier after the two screw retaining the duct to the carrier are removed. Refer to <u>Instrument Panel Carrier Replacement</u> Tighten: 1.0 N.m (9 lb in)
2	Windshield Defogger Nozzle Duct

CENTER AIR OUTLET DUCT REPLACEMENT

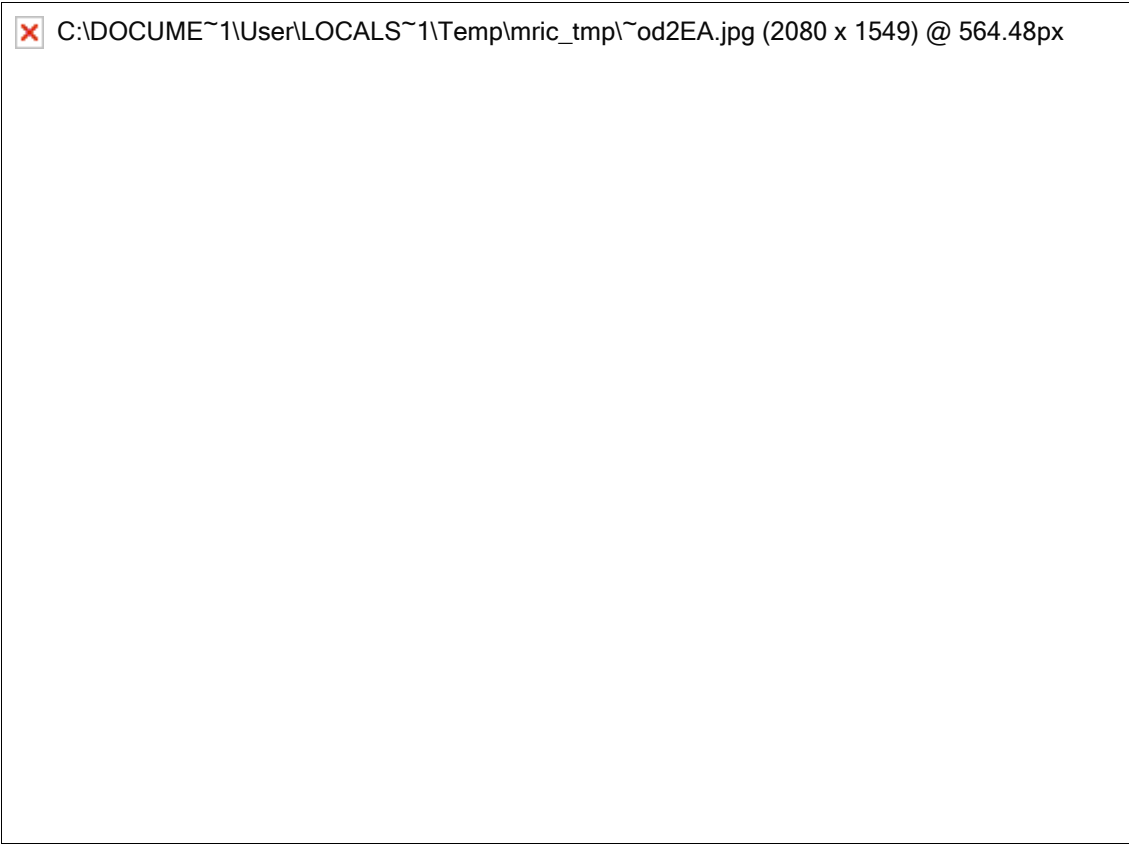


Fig. 49: Removing/Installing Center Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

Center Air Outlet Duct Replacement

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Callout	Component Name
Preliminary Procedure	
<ol style="list-style-type: none">1. Remove the instrument panel lower trim panel. Refer to <u>Instrument Panel Lower Trim Panel Replacement</u>2. Remove the instrument panel inflatable restraint module. Refer to <u>Inflatable Restraint Instrument Panel Module Replacement</u> .3. Remove the upper right air outlet duct. Refer to <u>Instrument Panel Outer Air Outlet Upper Duct Replacement - Right Side</u>4. Remove the upper left air outlet duct. Refer to <u>Instrument Panel Outer Air Outlet Upper Duct Replacement - Left Side</u>	
1	Instrument Panel Center Air Outlet Duct Screw (Qty: 3) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 1.0 N.m (9 lb in)
2	Instrument Panel Center Air Outlet Duct

SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - LEFT SIDE

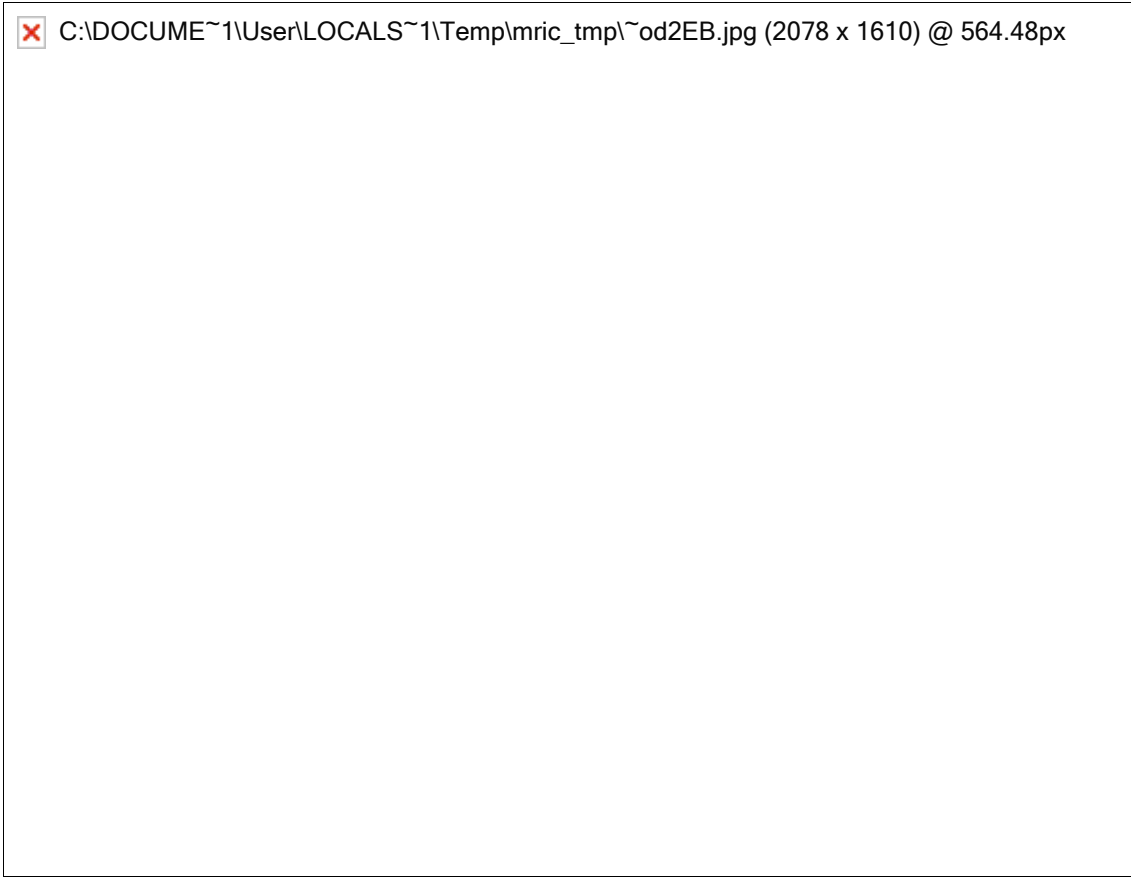


Fig. 50: Removing/Installing Side Window Defogger Outlet Duct - Left Side
Courtesy of GENERAL MOTORS CORP.

Side Window Defogger Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedure: Remove the instrument panel trim pad. Refer to <u>Instrument Panel Upper Trim Pad Replacement</u>	
1	Side Window Defogger Duct - Left, Screw NOTE: Refer to <u>Fastener Notice</u> . Tighten: 1.0 N.m (9 lb in)
2	Side Window Defogger Duct - Left

SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - RIGHT SIDE



Fig. 51: Removing/Installing Side Window Defogger Outlet Duct - Right Side
Courtesy of GENERAL MOTORS CORP.

Side Window Defogger Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure: Remove the instrument panel trim pad. Refer to <u>Instrument Panel Upper Trim Pad Replacement</u>	
1	Side Window Defogger Duct - Right, Screw NOTE: Refer to <u>Fastener Notice</u> . Tighten: 1.0 N.m (9 lb in)
2	Side Window Defogger Duct - Right

FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE



Fig. 52: Removing/Installing Floor Air Outlet Duct - Left Side
Courtesy of GENERAL MOTORS CORP.

Floor Air Outlet Duct Replacement - Left Side

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> Preliminary Procedure: Remove the instrument panel lower trim pad. Refer to <u>Instrument Panel Lower Trim Panel Replacement</u>	
1	Floor Air Outlet Duct, LH Tip: Unclip the left floor air outlet duct from the HVAC module and the heater core.

FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE



Fig. 53: Removing/Installing Floor Air Outlet Duct - Right Side
Courtesy of GENERAL MOTORS CORP.

Floor Air Outlet Duct Replacement - Right Side

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> Preliminary Procedure: Remove the instrument panel inflator module. Refer to <u>Inflatable Restraint Instrument Panel Module Replacement</u>	
1	Floor Air Outlet Duct, Screw Tighten: 1.0 N.m (9 lb in)
2	Floor Air Outlet Duct, RH

REAR FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE

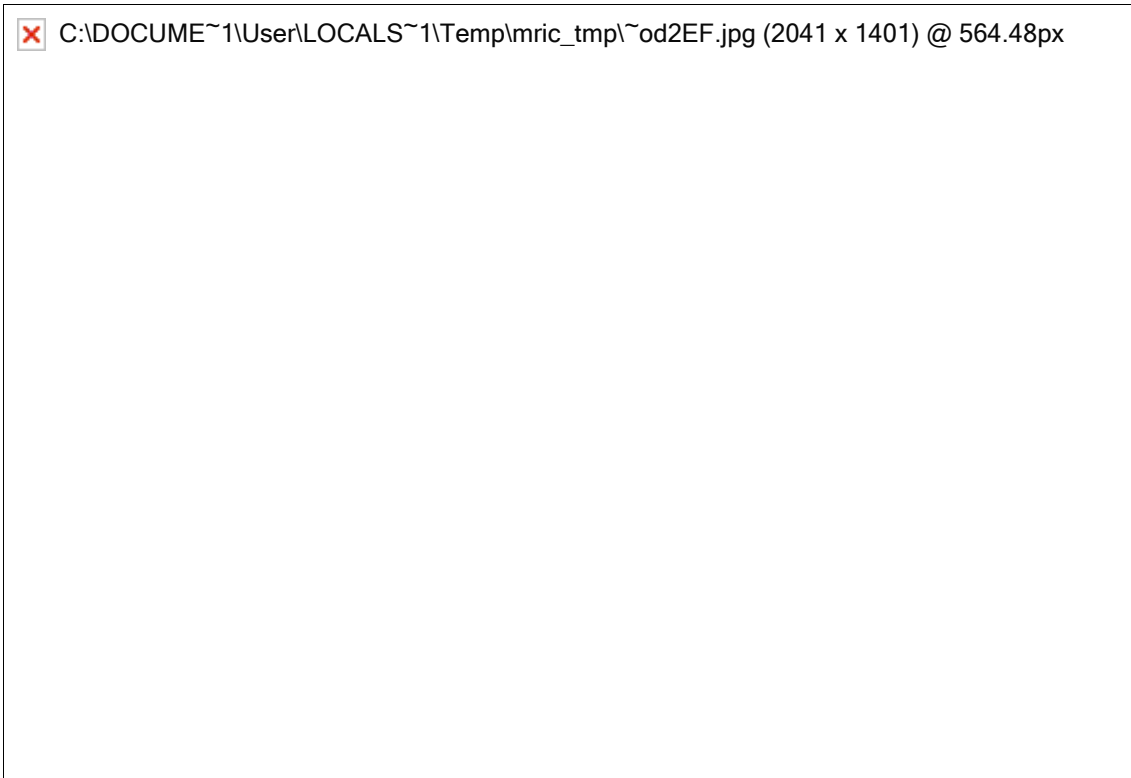


Fig. 54: Removing/Installing Rear Floor Air Outlet Duct - Left Side
Courtesy of GENERAL MOTORS CORP.

Rear Floor Air Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedure	
1. Remove the driver front seat. Refer to <u>Seat Replacement</u>	
2. Reposition the front carpet to access the left rear floor duct.	
3. Remove the center pillar trim panel. Refer to <u>Center Pillar Lower Garnish Molding Replacement</u> .	
4. Remove the front floor carpet retainer. Refer to <u>Front Carpet Retainer Replacement</u> .	
5. Remove the rear floor carpet retainer. Refer to <u>Rear Carpet Retainer Replacement</u> .	
1	Left Rear Air Outlet Duct

REAR FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

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Fig. 55: Removing/Installing Rear Floor Air Outlet Duct - Right Side
Courtesy of GENERAL MOTORS CORP.

Rear Floor Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure	
1. Remove the passenger front seat. Refer to <u>Seat Replacement</u>	
2. Reposition the front carpet to access the right rear floor duct.	
3. Remove the center pillar trim panel. Refer to <u>Center Pillar Lower Garnish Molding Replacement</u> .	
4. Remove the front floor carpet retainer. Refer to <u>Front Carpet Retainer Replacement</u> .	
5. Remove the rear floor carpet retainer. Refer to <u>Rear Carpet Retainer Replacement</u> .	
1	Right Rear Air Outlet Duct

AIR TEMPERATURE DOOR REPLACEMENT (CJ2)

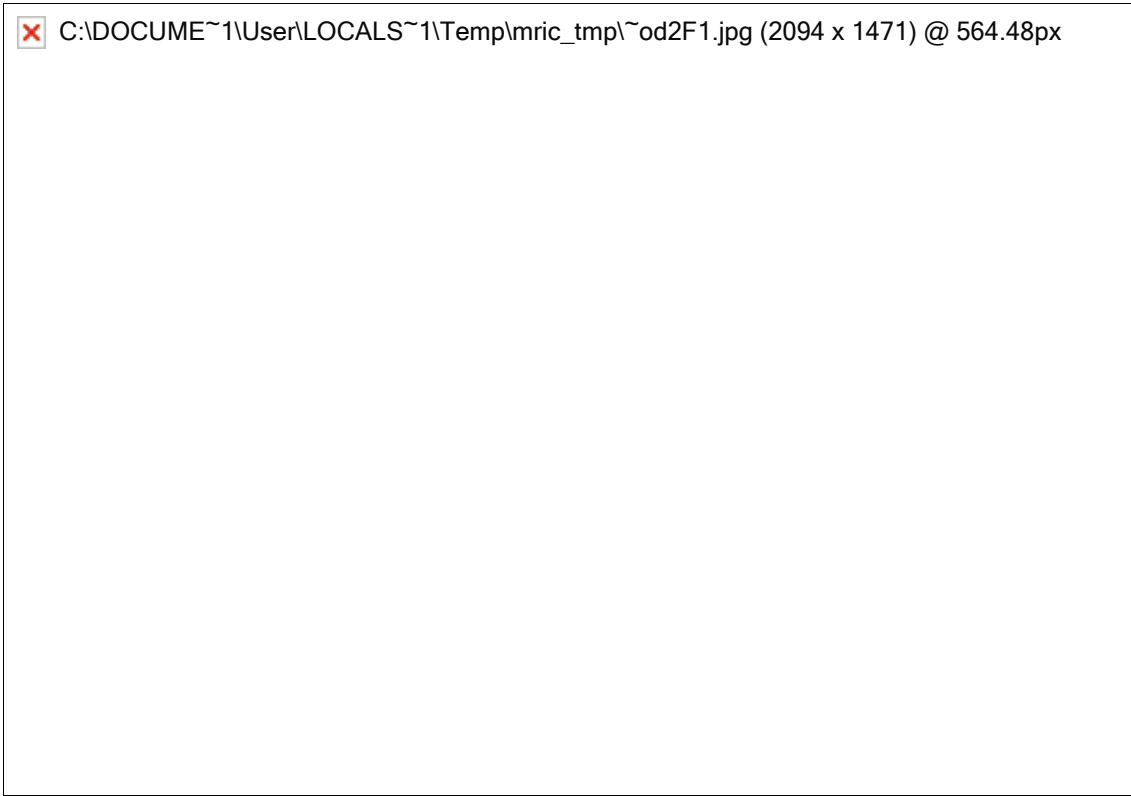


Fig. 56: Removing/Installing Air Temperature Door (CJ2)
Courtesy of GENERAL MOTORS CORP.

Air Temperature Door Replacement (CJ2)

Callout	Component Name
<p>NOTE: Refer to <u>Fastener Notice</u></p> <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u></p> <p>Preliminary Procedure</p> <ol style="list-style-type: none">1. Remove the HVAC module assembly. Refer to <u>HVAC Module Assembly Replacement</u>2. Remove the blower motor assembly from the HVAC module. Refer to <u>Blower Motor Replacement</u>3. Remove the left hand floor air outlet duct. Refer to <u>Floor Air Outlet Duct Replacement - Left Side</u>	

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4. Remove the heater core. Refer to **Heater Core Replacement**

IMPORTANT:

Leave the recirculation actuator attached to the air inlet housing assembly.

5. Remove the air inlet housing assembly. Refer to **Air Inlet Assembly Replacement**
6. Remove the thermal expansion valve from the evaporator core. Refer to **Thermal Expansion Valve Replacement**

1	Blower Case Clip (Qty: 2)
2	Air Distributor Case Screw (Qty: 6) Tighten: 1.0 N.m (9 lb in)
3	Heater and Air Conditioning Case Assembly
4	Air Distributor Case Assembly
5	Air Distributor Case Assembly Screw (Qty: 8) Tighten: 1.0 N.m (9 lb in)
6	Air Distributor Case - Left
7	Air Distributor Case - Right
8	Air Distributor Case - Center
9	Air Temperature Valve

AIR TEMPERATURE DOOR REPLACEMENT (C67)

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Fig. 57: Removing/Installing Air Temperature Door (C67)
Courtesy of GENERAL MOTORS CORP.

Air Temperature Door Replacement (C67)

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
<ol style="list-style-type: none">1. Remove the HVAC module assembly. Refer to <u>HVAC Module Assembly Replacement</u>2. Remove the blower motor assembly from the HVAC module. Refer to <u>Blower Motor Replacement</u>3. Remove the left hand floor air outlet duct. Refer to <u>Floor Air Outlet Duct Replacement - Left Side</u>4. Remove the heater core. Refer to <u>Heater Core Replacement</u>	

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IMPORTANT:

Leave the recirculation actuator attached to the air inlet housing assembly.

5. Remove the air inlet housing assembly. Refer to **Air Inlet Assembly Replacement**
6. Remove the thermal expansion valve from the evaporator core. Refer to **Thermal Expansion Valve Replacement**

1	Blower Case Clip (Qty: 2)
2	Air Distributor Case Screw (Qty: 6) Tighten: 1.0 N.m (9 lb in)
3	Heater and Air Conditioning Case Assembly
4	Air Distributor Case Assembly
5	Air Distributor Case Assembly Clip
6	Air Distributor Case Assembly Screw (Qty: 11) Tighten: 1.0 N.m (9 lb in)
7	Air Distributor Case - Left
8	Air Distributor Case - Right
9	Air Temperature Valve

MODE DOOR REPLACEMENT

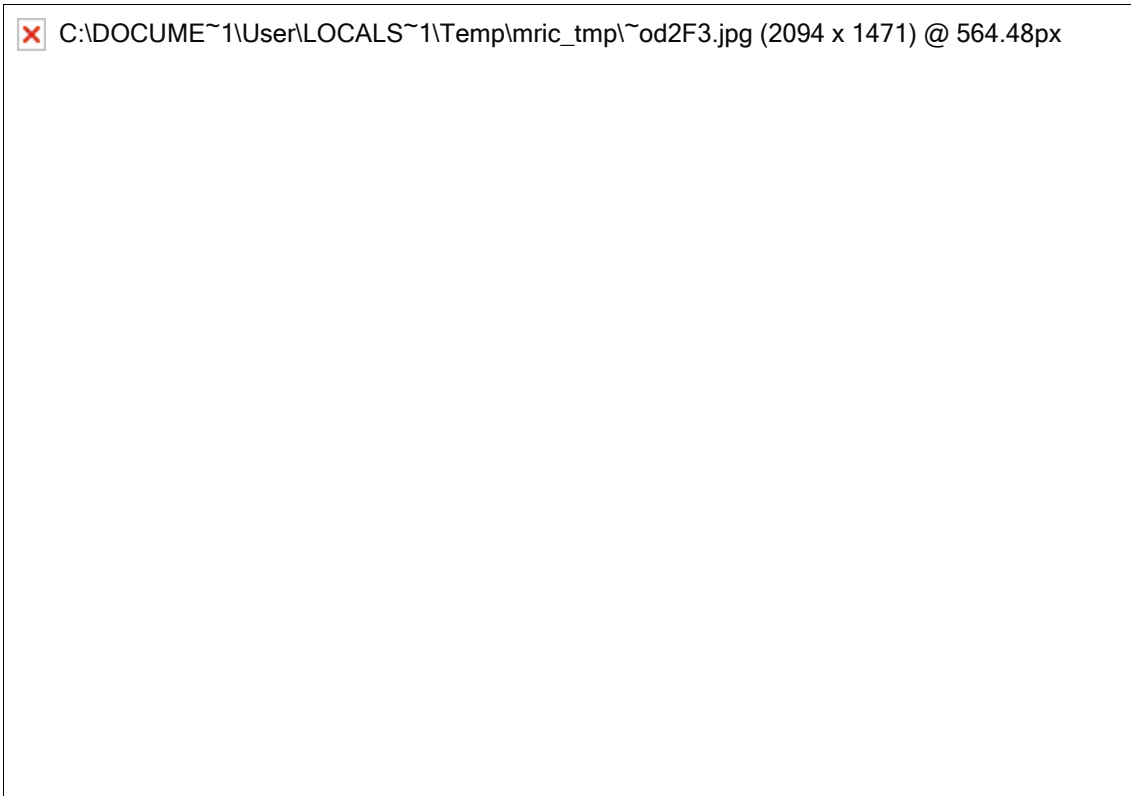


Fig. 58: Identifying Mode Door
Courtesy of GENERAL MOTORS CORP.

Mode Door Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Remove the HVAC module assembly. Refer to <u>HVAC Module Assembly Replacement</u>	
2. Remove the blower motor assembly from the HVAC module. Refer to <u>Blower Motor Replacement</u>	
3. Remove the left hand floor air outlet duct. Refer to <u>Floor Air Outlet Duct Replacement - Left Side</u>	
4. Remove the heater core. Refer to <u>Heater Core Replacement</u>	

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IMPORTANT:

Leave the recirculation actuator attached to the air inlet housing assembly.

5. Remove the air inlet housing assembly. Refer to **Air Inlet Assembly Replacement**
6. Remove the thermal expansion valve from the evaporator core. Refer to **Thermal Expansion Valve Replacement**

1	Blower Case Clip (Qty: 2)
2	Air Distributor Case Screw (Qty: 6) Tighten: 1.0 N.m (9 lb in)
3	Heater and Air Conditioning Case Assembly
4	Air Distributor Case Assembly
5	Air Distributor Case Assembly Screw (Qty: 8) Tighten: 1.0 N.m (9 lb in)
6	Air Distributor Case - Left
7	Air Distributor Case - Right
8	Air Distributor Case - Center
9	Mode Valve Assembly

RECIRCULATION DOOR REPLACEMENT



Fig. 59: Identifying Recirculation Door
Courtesy of GENERAL MOTORS CORP.

Recirculation Door Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u>	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>	
Preliminary Procedure	
1. Remove the HVAC module. Refer to HVAC Module Assembly Replacement	

2. Disconnect the recirculation actuator electrical connector.	
1	Recirculation Actuator Screw (Qty: 2) Tighten: 1.0 N.m (9 lb in)
2	Recirculation Actuator
3	Air Inlet Housing Door Lever
4	Air Inlet Housing Screw (Qty: 2) Tighten: 1.0 N.m (9 lb in)
5	Air Inlet Housing
6	Air Inlet Housing Door

HEATER CORE REPLACEMENT

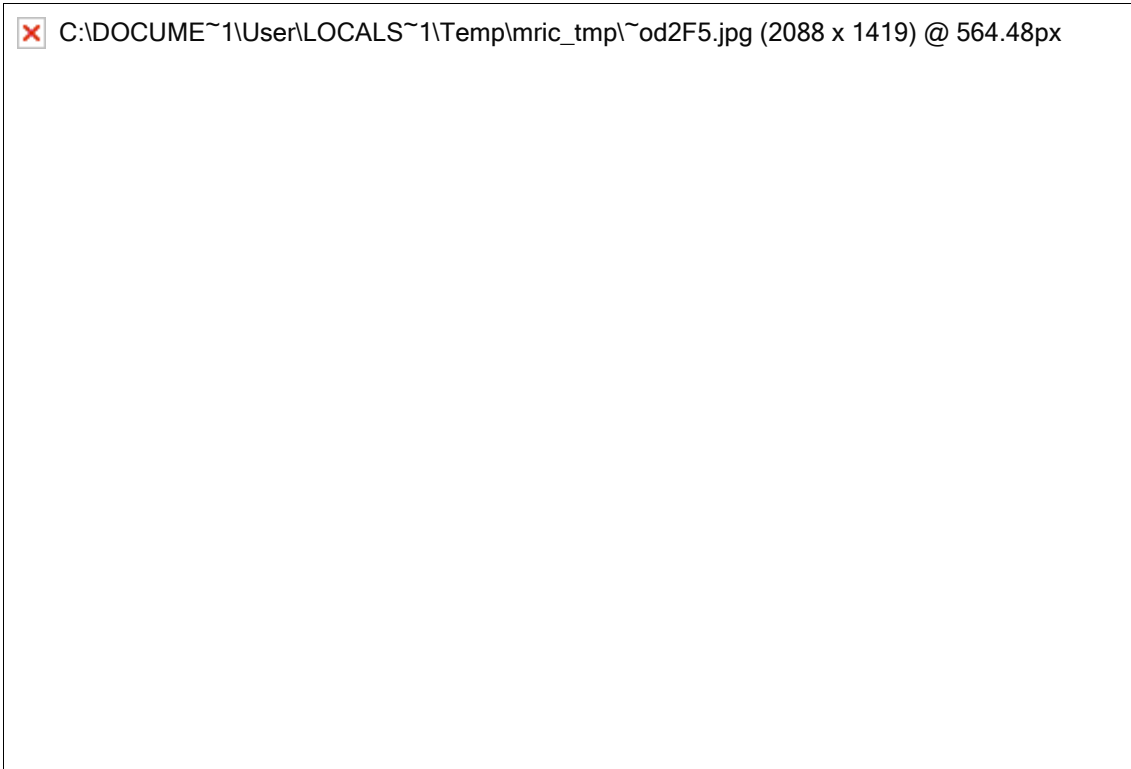


Fig. 60: Removing/Installing Heater Core
Courtesy of GENERAL MOTORS CORP.

Heater Core Replacement

Callout	Component Name
Preliminary Procedure	

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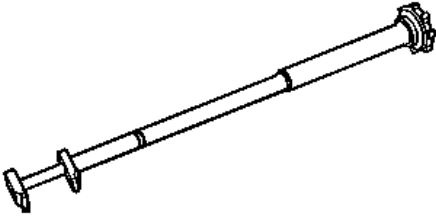
1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
2. Remove the left hand floor duct. Refer to **Floor Air Outlet Duct Replacement - Left Side**.

1	TXV Pass Through Seal
2	Heater and A/C Pipe Screw (Qty: 3) NOTE: Refer to <u>Fastener Notice</u> Tighten: 1.0 N.m (9 lb in)
3	Heater and A/C Pipe Cover
4	Heater Core Tube Clamp Screw Tighten: 1.0 N.m (9 lb in)
5	Heater Core Tube Clamp
6	Core, Heater

SPECIAL TOOLS AND EQUIPMENT

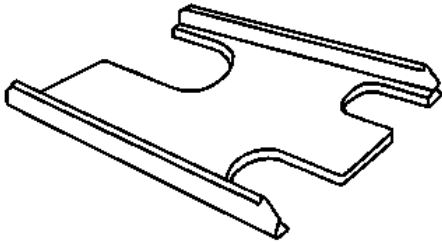
SPECIAL TOOLS

Special Tools

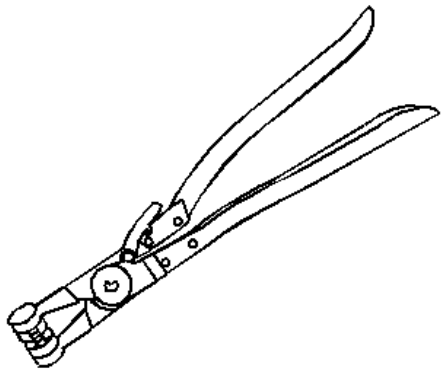
Illustration	Tool Number/Description
	J 37097-A Heater Close Clamp Tool

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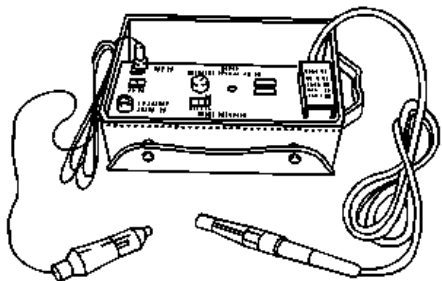
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J 38042 Dual O-Ring Tube Separator



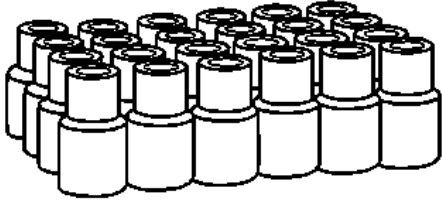
J 38185 Hose Clamp Pliers



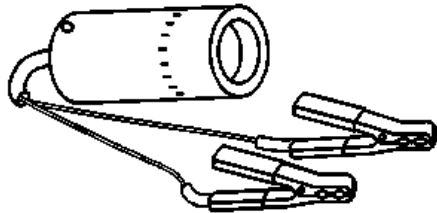
J 39400-A
Halogen Leak Detector

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J 41447
R-134A A/C Tracer Dye - Box of 24

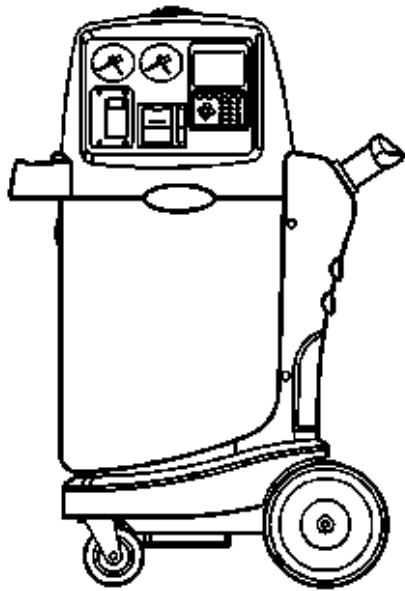


J 42220
Universal 12V Leak Detection Lamp

J 43600
ACR 2000 Air Conditioning Service Center

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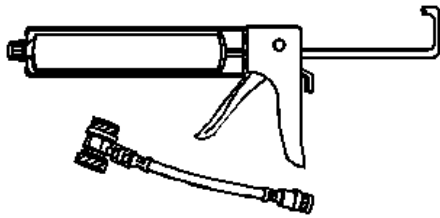


J 43872
Fluorescent Dye Cleaner

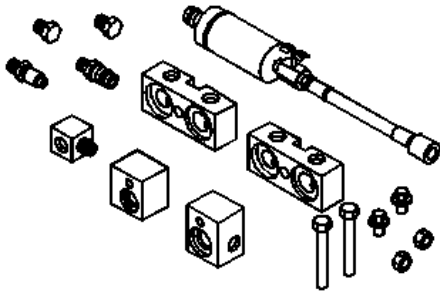


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J 45037
A/C Oil Injector

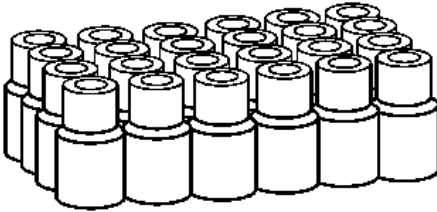
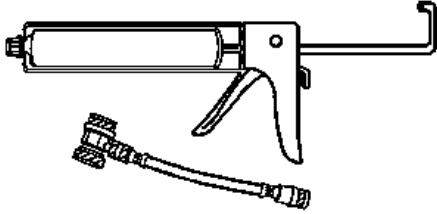


J 45268
Flush Adapter Kit

J 46297
A/C Dye Injector Kit

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J 46297-12
Replacement Dye Cartridges